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Thesis

A STUDY OF THE RELATIONSHIP OF SCORES ON SUB-TESTS IN IOWA EVERY-PUPIL TESTS OF BASIC SKILLS, FORM N, TEST B AND TEACHERS' MARKS IN ARITHMETIC, HISTORY, GEOGRAPHY LANGUAGE AND LITERATURE

Submitted by

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In partial fulfillment of requirements
for the degree of Master of Education

1948

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CHAPTER I

INTRODUCTION AND PURPOSE OF THE STUDY

The purpose of this study is an effort to determine the relationship between scores on the Sub-Tests of the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, on Work-Study Skills[1] and teachers' marks in arithmetic, geography, history language, and literature.

SCOPE OF THE STUDY

The present study was carried out in an industrial city of New England, Manchester, New Hampshire. It has a population of about 80,000 made up of all nationalities and types.

The school system is on the 8-4 plan. Report card marks are given quarterly and these marks were available for the year 1946-1947.

In November 1946 the Iowa Every-Pupil Tests of Basic Skills Form N, Test B, on Work-Study Skills was administered to the eighth-grade pupils. 210 pupils were selected for this study; 101 boys and 109 girls. They represent a cross-section of the eighth-grade population.

Description of Test Measures Used in the Study

The Terman-McNemar Test of Mental Ability[2], which is a revision of the Terman Group Test of Mental Ability, consists of seven sub-tests: Information, Synonyms, Logical Selection, Classification, Analogies, Opposites, and Best Answers. Length of time required to administer is 40 minutes. An Intelligence

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[1] Iowa Every-Pupil Tests of Basic Skills. Houghton-Mifflin Company. Boston.

[2] Terman-McNemar Test of Mental Ability. World Book Company.

Score is obtained on this test. The authors of this test state in the Manual of Directions that "more homogeneous material has been used in order to have a test more highly saturated with a common factor or ability.........may be characterized as that of general verbal intelligence. The new forms are essentially power tests." A copy of the test and the manual are to be found in the Appendix.

The Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, on Work-Study Skills is made up of five sub-tests, employing skills in map reading, the use of references, the use of an index, the use of the dictionary, and the reading of graphs, charts, and tables. The time required for administering is about 90 minutes. This test gives measures which have not before been available in many schools where the test will be given. A copy of the test will be found in the Appendix.

Teachers' marks are used as a further variable for checking validity of test measures. Much has been written on the subject of teachers' marks. Some writers report them to be unreliable while others report reliability for teachers' marks as a valid measure of achievement. Klapper1/ points out that:

> No final estimate of a child should be reached without giving full and sympathetic consideration to the teachers' judgments, but no teacher's estimate should be accepted as final; it should be supplemented with the best objective checks or tests devised by the psychologists.

This was in connection with marking the child according to his intelligence.

1/ Klapper, Paul, Contemporary Education Its Principles and Practice. D. Appleton & Company. New York, 1929, p. 450.

In their book, Barr and Burton[1] discuss the reliabilty of teachers' marks. They report the findings of the Starch and Elliott investigations and of other similar studies. Out of all the studies, two facts were established; that teachers differ greatly in their evaluations of the same pieces of work and they also differ as much in one subject as in another.

Contrary to these reports of unreliability of teachers' marks is the study made by Swineford[2] in which she examines the purported unreliability of teachers' marks. Data used in her investigation included scores on an arithmetic test, the sum of scores on three verbal tests, chronological ages, teachers' marks in reading, English, and history as well as teachers' ratings on deportment. She used three elementary schools with eleven classroom groups in Grades 6, 7, and 8. Multiple regression equations were employed for estimating teachers' marks in the school subjects from the two variables, arithmetic and verbal scores. This was done for all eleven groups. A median value of 172 was found. "If teachers' marks were not reliable, then they would not be so highly related to outside measures," is the conclusion reached. Other conclusions reached were that individual teachers tend to make reliable estimates. This was concluded from the fact that 28 out of 33 multiple correlations were +.75 or greater and that standards vary with teachers. Her final conclusion was that, "this report shows how reliable teachers' marks are in a community of good educational standards, such as

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[1] Barr, A. S. & Burton, W. H., The Supervision of Instruction. D. Appleton & Company. New York, 1926, pp. 294-295.

[2] Swineford, Frances, "Examination of the Purported Unreliability of Teachers' Marks", Elementary School Journal, XLVII (May, 1947)

represented here, and suggests ways in which even more satisfactory (more valid) results might be obtained in this or any other community."

Are teachers' marks in the present study of the Iowa Tests reliable? The writer makes the assumption that they are both valid and reliable.

JUSTIFICATION

The results of many studies have shown the necessity for definite instruction in the teaching of study skills. Among these skills are those of reading maps, using reference materials, and reading graphs, charts, and tables. The results have also shown that incidental teaching has proved to be without value.

Since this study is based upon the relation between the results of study skills, intelligence, and achievement, pertinent research will be reviewed.

In her study, Wilson1/ lists ten major difficulties in using geography texts. She used five text-books to gather the data for her study. For the present study number Four of her list is important. It is given the title "Difficulties due to lack of provision for developing skills." Under this heading are found the study helps; use of cross-references, use of table of contents, use of index, and construction and interpretation of graphs, and maps. Among her results the most pertinent to this study is number Seven which follows:

> Difficulties due to lack of provision for developing skills were cited most frequently for all of the texts.

1/ Wilson, Ella M., "Difficulties in Using Geography Texts", National Society for the Study of Education Yearbook, XXXII, pp, 475-479.

> There are no standards for selecting skills or for grading them in difficulty. Texts would present fewer difficulties to children were there some agreement as to what skills and how many of them should be taught in each grade.

In a study made of abilities in map reading, Howe[1] used children in Grades 4, 5, and 6. He set up a list of questions involving the use of tools that elementary pupils must use in the interpretation of maps. He received a low percentage of correct answers and found the children's concepts in map work to be "inexact and obscure". He concluded that "Courses of study should provide for the systematic development of map reading techniques" and that, "a more careful development of map skills is needed in text books."

Thomas[2], in her study of the ability of children to interpret graphs, made use of the five common types of graphs; circle, horizontal bar, multiple-picture, line graphs, and two-dimension diagram. She tested 355 children in Grades 4, 5, 6, and 7 of slow, average, and superior ability. She found that the picture two-dimension diagrams and circle graphs proved the easiest while the line graph was the most difficult for all pupils. Her conclusion was that "with proper instruction and explanation, children in the seventh grade can interpret all simple graphs."

In a study carried out by Thorpe[3] the need for giving instruction in the use of geography tools was studied. Her purpose was:

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[1] Howe, George F., "A Study of the Ability of Elementary School Pupils to Read Maps", *National Society for the Study of Education, Yearbook XXXII*, pp. 486-492.

[2] Thomas, Katheryne C., "The Ability of Children to Interpret Graphs", *National Society for the Study of Education, XXXII*, pp. 492-494.

[3] Thorpe, Mary T., *Objective Studies in Showing Need for Giving Instruction in Use of Geography Tools*, Boston University Thesis, 1932.

"To determine which tools, necessary to geography study, can be satisfactorily measured and evaluated.

"To determine which grades appear the best adapted for directed training in the various steps of skill acquisition."

Five studies were made involving 556 pupils in Grades 4, 5, and 6. Among the tools tested were diagrams, use of index, reading and interpretation of all kinds of graphs. Studies Four and Five are most valuable to the present study. Study Four was "intended to show power to use index key, index, appendix, statistical tables, and tabulation of numerical facts." Study Five was "intended to test power to read, make, and interpret picture, bar, broken line, and circle graphs."

In her summary she brings out the fact that "incidental introduction to the many geographical tools has failed to give satisfactory training in usage. Outcomes show the Index to have been neglected and the Appendix to be a more difficult problem than the Index.

Ernest Horn1/ considers locating information, use of dictionary, use of index, and general reference book as important study skills or abilities.

An analysis of all these studies indicates the need for well-planned, systematic instruction of study skills.

DEFINITION OF TERMS

What is meant by study skills?

Burton2/ gives the following definition of a skill: "A skill

1/ Horn, Ernest. Preface to Learn to Study Readers, Book IV, Ginn and Company, Boston, 1926.

2/ Burton, William H. The Guidance of Learning Activities, D. Appleton-Century Company, New York, 1944, page 33.

is the facility in performance of any given response; it is a relatively fixed, relatively automatic response to similar and recurring situations".

The skills under discussion are map reading, use of reference, use of index, use of dictionary, and reading graphs, charts, and tables.

In reference to map reading Moore and Wilcox1/ make the following statement:

> A map is written in a foreign language until a teacher has helped the child to acquire the skills needed for intelligent map reading and interpretations......The acquirement of facility in the use of this tool requires definite and well-planned instruction.

In the Manual for Form N of the Iowa Every-Pupil Tests of Basic Skills is found the following: " A map employs certain symbols and conventions which form a language.....Map reading involves a group of specific abilities".

Among the abilities tested are those required for:

I Map Reading

1. Ability to visualize the represented area in its natural plane and to read direction correctly.
2. Recognizing and interpreting standard map symbols.
3. Identifying and visualizing symbols with the use of a key.
4. Ability to get facts and information from parallels and meridians.
5. Ability to apply physical facts to map situations.2/

1/ Moore, C. B. and Wilcox, Lillian A., The Teaching of Geography, American Book Company, Boston, 1932, pp. 68, 225.

2/ Manual for Interpretation of Iowa Every-Pupil Tests of Basic Skills, Houghton-Mifflin Company, 1941

II The knowledge of the type of reference to use in solving particular problems should properly be a by-product of the regular use of references.1/

Skills tested in the Use of References are:

1. To recognize questions the answers to which may best be found in atlases or maps.
2. To recognize questions the answers to which may best be found in dictionaries.
3. To recognize questions the answers to which may best be found in encyclopedias.
4. To recognize questions the answers to which may best be found in yearbooks.
5. To recognize questions the answers to which may best be found in specific sources such as textbooks, globes, government publications, etc.

III Using the index is a reading skill. The efficient use of books depends in great part on the ability to use an index effectively.

Skills involved in the use of the index are:

1. Learning the names of letters, recognition of each.
2. Learning the location of letters in the alphabet.
3. Arranging words alphabetically.
4. Using the index in simpler situations.
5. Learning more difficult uses of the index. McBroom2/

1/ Manual for Interpretation of Iowa Every-Pupil Tests of Basic Skills, Houghton-Mifflin Company, 1941

2/ McBroom, Maude., A Course of Study in the Use of the Index", University of Iowa Extension Bulletin, No. 502, Iowa City, Iowa,1941

IV For a child to be able to use a dictionary independently and effectively, the following skills should be acquired.

1. Ability to alphabetize.
2. Ability to use symbols.
3. **Ability** to use pronunciation keys.
4. Ability to choose which of several meanings to employ in a given context.

V Graphs, charts, and tables are tools for giving knowledge, and as such, require the use of specific skills and abilities. The language of graphs, charts, and tables must be put at his (the child's) command.

These abilities are:

1. To comprehend from the title the topic on which a graph gives information.
2. To recognize from subtitles and row in column headings what is shown by each part of a graph.
3. To read amounts from a graph.
4. To compare two or more values read from a graph.
5. To determine trends as shown on a line graph.
6. To realize that percentages do not give absolute amounts.
7. To compare values given in different columns in a table in order to solve a

problem.

8. To grasp the outstanding fact portrayed by a graph.
9. To determine rank from an unordered list of numbers.

The Intelligence Score as obtained from the Terman-McNemar Test of Mental Ability and used in this study is defined by the authors as "a deviation IQ, a procedure which requires that the difference be found between the obtained standard score and the average standard score for other individuals of the same age." The deviation is interpreted in terms of IQ from a table devised by the authors.

Teachers' marks represent the evaluation of learning achievement in the subject areas being appraised.

The foregoing definitions are used throughout this study.

As a result of conclusions reached, the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, on Work-Study Skills has been chosen as the basis for this study.

The aims of the Iowa Every-Pupil Tests of Basic Skills as given in the Manual of General Information1/ are:

1. To enable teachers and school officials to become more intimately and reliably acquainted with the educational accomplishments and capabilities of each pupil, in order that instruction and guidance may be better adapted to his individual needs, interests, and abilities.

1/ Manual of General Information. Houghton Mifflin Company, Boston, 1947.

2. To provide the school officials with a more objective and dependable basis for the evaluation of school and class achievement.

These aims indicate a desirable type of development, a type of improvement toward which the teacher directs her activities and through which she determines those phases of the pupil's development most in need of attention. These results indicate the type of remedial and individual instruction that is required.

As stated, this study is concerned with Work-Study Skills only. The claim is made in the manual that the test is unique in its field in that provision is made for a type of testing not previously employed in any other current tests. It further states that the results of the Iowa testing program indicate that these skills have been seriously neglected. It is suggested that the cause may be attributed to the belief that such abilities may be acquired incidentally or to the common practice of relying on a single text-book and failure to provide sufficient reference materials.

Teachers have placed a great deal of confidence in the results of the test and have accepted the claims presented by the authors. The questions naturally arise: Is this confidence justified? Do the Iowa Every-Pupil Tests of Basic Skills provide a valid instrument for the prediction of future success and may they be used as a tool for individual guidance?

The plan for arriving at answers to these questions is briefly to analyze the results of the test in terms of sub-test

validity, teachers' marks, and intelligence.

More specifically it is the purpose of this thesis to answer the following questions.

1. Do the intercorrelations of the sub-tests indicate that they are measuring different aspects of eventual success?
2. How well do the individual scores of sub-tests show relationship with subsequent success?
3. Is the correlation between skills scores and teachers' marks greater or less than intelligence and achievement?
4. How well do teachers' marks in separate subjects correlate with intelligence quotients?
5. Is there significant correlation between intelligence scores and total scores on the sub-tests?

This study is designed to meet an apparent need with the hope that in answering the above questions it may reveal the amount of relationship between scores of sub-tests of Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, Work-Study Skills, and Teachers' marks in arithmetic, geography, history, language, and literature.

CHAPTER II

RESEARCH RELATED TO STUDY

Research in the field of Work Study Skills was found to be limited. A few comprehensive studies have been made but for the most part the treatment of the subject has been superficial. Of the research available the writer of this study makes the following report.

RESEARCH RELATIVE TO THE WORK-STUDY SKILLS

Cook[1] carried on a study using the Iowa Every-Pupil Tests of Basic Skills, Form 1, Test B. The study employed 350 children in grades six, seven, and eight with emphasis on three of the five sub-tests; map reading, use of index, and reading graphs, charts, and tables. The conclusion reached was that most of the skill in reading graphs, charts, and tables was left to incidental teaching as the pupils tested did not show a very high degree of mastery. It was evident that some skills were not taught at all and, if taught, not until the eighth grade. Language handicaps were found to lower the pupil's score and also affect the class score because of difficulty in interpreting the questions.

Another study employing the Iowa Every-Pupil Tests of Basic Skills was carried on by Fahnle.[2] The purpose of this study

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[1] Cook, Hannah B. An Analysis of Basic Work-Study Skills in Grades Six, Seven, and Eight, Unpublished Boston University Thesis, 1944.

[2] Fahnle, Chester G. The Relative Effectiveness of Measures of Grade School Achievement in Predicting Scores on High School Tests, University of Iowa Thesis, 1940.

was

> To determine the relationship between the scores on four tests of grade school achievement and on three tests of high school achievement. It is an attempt to determine whether the Iowa Every-Pupil Tests of Basic Skills can be used for prognostic purposes in high school.

The pupils were given the 1937 edition of the Iowa Every-Pupil Tests of Basic Skills. It was found that Work-Study Skill results could be used as an indicator of success in Algebra and also in General Science. His conclusions were that grade school achievement was a favorable prediction of success in high school subjects and that scores on parts of the Iowa Every-Pupil Tests of Basic Skills were a much better indicator of high school success than were intelligence scores.

Littlefield[1/] constructed a diagnostic test on map skills. After an analysis of the test results she concluded that much of the learning of map skills was incidental. The test did not ascertain whether deficiencies were due to an inability to interpret map symbols or to a lack of knowledge of the principles involved.

A similar study was made by Brooks[2/] who concluded that:

> It is becoming increasingly apparent that incidental teaching fails, in general, to provide children in the intermediate grades with the map reading skills so necessary in developing certain understandings in the social studies.

Shyrock[3/], in an article about grading the skills necessary for map reading, listed four causes of poor map reading. These

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[1/] Littlefield, H. W. The Construction and Evaluation of a Diagnostic Test on Map Skills, Boston University Thesis, Unpublished, 1947.

[2/] Brooks, Winifred. Exercises in Map Interpretation, Boston University Service Paper, 1946.

[3/] Shyrock, Clara. "Gradations in Map Reading", Journal of Geography, Vol. 38: 5, May 1939.

were inadequate map equipment, size of map and the amount of data it contained, lack of uniformity in the use of map symbols, and the result of placing the map with all its symbols in front of a child when he had had no instruction on how to interpret it. The results indicated that by careful development, skillful guidance throughout the levels of learning and with adequate map equipment, efficiency could be obtained.

The above findings show that incidental teaching is without value and points out the need for well-planned development of work-study skills.

RESEARCH RELATIVE TO TEACHERS' MARKS

Research in the area of teachers' marks found opinion to be divided. There were those who believed that teachers' marks were a reliable measure of a pupil's achievement in school work whereas others believed that teachers' marks were unreliable. As the greater part of a pupil's progress in school depends upon teachers' marks, both points of view should be considered. This was done in the following reports.

Kelly 1/ studied the marks of 88 pupils given by teachers in June and January. The first marks were given upon promotion from 6A to 7B and the latter marks were given upon promotion from 7B to 7A. Tables were made showing gains and losses. The tables indicated, "that there is no uniformity among the standards used by the several teachers in giving marks to pupils".

Sobel2/ made a study of 172 pupils in grades seven and eight.

1/ Kelly, Fred J. "Teachers' Marks, Their Variability and Standardization", Contribution to Education, No. 66, Teachers College, Columbia University.

2/ Sobel, Frances S. "Teachers' Marks and Objective Tests as Indices of School Adjustment", Contributions to Education, No. 674, Teachers College, Columbia University, 1936.

These pupils had been given both the Terman Test of Mental Ability and the Otis Self-Administering Test of Mental Ability as well as the Standard Achievement Test, and four personality tests. Their handwriting had been rated on the Ayers Penmanship Scale. Also available were their school records. After a thorough study of all this data the author found indications that factors such as handwriting, punctuality, and personality tended to influence success as measured by teachers' marks. However, upon computing coefficients of consistency, the author found that the marks of the teachers indicated a degree of consistency amounting to +.78 which meant that the teachers were fairly consistent in the marks they assigned to pupils at different times. There was no indication of validity or what was actually being measured.

Another study of the reliability of teachers' marks was carried out by Taylor[1]. Part II of this study was carried out on 226 seventh grade pupils. Teachers' marks were available in English, mathematics, geography and history as earned in the sixth grade, as well as scores on the Otis Self-Administering Group Test of Mental Ability, Sangren-Woody Test in Reading, Parts 1, 2, and 3, and scores on the Stanford Achievement Test in Arithmetic, Parts 4 and 5. To find the reliability of the teachers' marks all data was studied. An average of reliability of the quarterly marks of eleven teachers was +.863. This indicated that teachers' quarterly marks had a much higher degree of reliability than had been supposed.

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[1] Taylor, J. Carey. "The Reliability of Quarterly Marks in the Seventh Grade of Junior High School, Together with the Value of Certain Standard Tests in Predicting Them", The Johns Hopkins Studies in Education, No. 17, The Johns Hopkins Press, Baltimore, 1931.

The author found that the Otis Test of Mental Ability correlates more highly with teachers' marks than with the Stanford Arithmetic Test or the Stanford Reading Test.

In conclusion, the author found that his study substantiated the statement that a teacher's mark in a single examination might be unreliable but that when several estimates were made, the reliability increased. Therefore, the teacher's mark when based on several marks rather than a few, was a good measure of achievement for the pupil.

In summarizing the above research, most of the findings point to the reliability of teachers' marks as an estimate of school achievement.

RESEARCH RELATIVE TO INTELLIGENCE AND ACHIEVEMENT

Most educators agree that in the consideration of class averages achievement in school is dependent to a great degree on intelligence. Furthermore, they indicate that achievement for groups may be predicted with a high degree of reliability when average intelligence quotients for the groups are known. The following research presents supporting evidence.

An analysis of the Terman-McNemar Test of Mental Ability was made by Tyler[1]. The sampling for his study consisted of 100 students in Grade 9 in Nelson, British Columbia. He found that the test was essentially a power test. Form D was used and found suitable at Grade 9 level.

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[1] Tyler, Frederick T. "Analysis of the Terman-McNemar Test of Mental Ability," Educational and Psychological Measurement, 5: 49-58, Spring, 1945.

He carried out a second study with 88 ninth graders, using Form C of the Terman-McNemar Test of Mental Ability. The test proved too easy for this group as it failed to discriminate between mental ages of a large percentage of the students.

The author found the test to be what the authors claimed it to be, a power test measuring general verbal intelligence. He found that sub-tests two, three, and six had the highest reliabilities, and sub-tests four and five to have less reliability, with sub-test four less reliable than sub-test five.

His criticism of the test was that it proved too easy at the Grade 9 level. He suggested that, "the test could be considerably reduced in content with little loss in reliability".

The St. John1/ study was carried out in elementary grades. Teachers' marks in reading and arithmetic were used as well as intelligence scores and scores on a standard test. Correlations were computed. It was found that teachers' marks in subjects used did not correlate as highly with intelligence as did the achievement test scores. Intercorrelations of marks were higher than were the intercorrelations of the achievement tests. All correlations were found to be positive and reliable. These findings were interpreted as meaning that because intelligence scores correlated more highly with standard achievement test scores than with teachers' marks it did not indicate which of the two criteria was the more valid. The higher correlation of

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1/ St. John, Charles W. Educational Achievement in Relation to Intelligence, as shown by teachers' marks, promotions, and scores in Standard tests in certain elementary grades, Harvard University Press, 1930.

the test results with intelligence scores might have been due to common elements in the two types of achievement.

The author drew the following conclusion from his study.

> Obvious meaning of the given data is that the special abilities which children acquire in school tend to be of the same order of merit as their total of abilities, but that very many pupils, being exceptions to this rule, develop distinctly more, or less, of the school abilities than of other abilities.

A similar study was made by Klein[1/] when he compared intelligence scores with achievement of 181 girls ranging in intelligence from 67 to 134. The intelligence scores were obtained on the Terman Group Test of Mental Ability. The purpose of the study was to find out how well the intelligence scores predicted achievement in the first quarter of high school.

Actual results bore out to a very marked degree the forecast of the intelligence tests.

In summing up the research as reported, the following conclusions could be drawn.

1. That average intelligence and achievement of groups are closely related and that one can be predicted by the other.
2. That teachers' marks on the whole are a reliable estimate of school achievement.
3. That standards of marking for teachers should be set up .
4. That incidental teaching of work-study skills is not enough. The teaching must be well-planned and developed.

1/ Klein, Adolph. "I.Q.'s Compared with Achievement", Bulletin of High Points, Board of Education, Office of Publication, New York, 1930, No. 2, pp. 3-5.

For the present study, the above conclusions may be used in the succeeding chapters.

CHAPTER III

PLAN OF STUDY

As indicated in an earlier chapter this study is concerned with a comparison of scores achieved on the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, and teachers' marks for the same group of pupils.

The correlation technique has been chosen instead of the critical ratio technique because in this particular study it seems wise to find and interpret comparisons and relationships between variables.

STATISTICAL DESIGN

In order to achieve these results, it was necessary to find the correlations between results achieved by pupils on the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, and teachers' marks. Five school subjects were used: arithmetic, history, geography, literature and language. The Iowa Test has five subtests which were correlated with other variables and intercorrelated. In order to make the study more valid intelligence scores as obtained on the Terman-McNemar Test of Mental Ability were employed. Correlations were made between intelligence scores and teachers' marks in the five subject areas. Correlations were also found between intelligence scores and total scores on the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B.

The following charts show the correlations which were planned for this study.

Chart 1. Proposed Correlations between Results on the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, and Teachers' Marks in Five Subject Areas.

		Arithmetic	History	Geography	Literature	Language
I	Map Reading			x		
II	Use of Reference		x	x		x
III	Use of Index		x	x	x	x
IV	Use of Dictionary		x	x	x	
V	Reading Graphs, Charts, Tables	x	x	x	x	x

As shown in the above chart correlations were to be made between sub-test results and teachers' marks in selected instances. These correlations were chosen as those contributing most to this study. These correlations were to be computed to find out how much, if any, relation there was between areas correlated. They should reveal the degree of validity and reliability of teachers' marks when compared with the results of the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B.

Chart 2. Proposed Intercorrelations between Sub-test scores on Iowa Every-Pupil Tests of Basic Skills.

Subtests	II	III	IV	V
I Map Reading	x	x	x	x
II Use of References		x	x	x
III Use of Index			x	x
IV Use of Dictionary				x
V Reading Graphs, Charts, Tables				

These intercorrelations were to be figured in order to find out whether or not certain sub-tests were measuring the same thing or something different. Do the tests measure what they purport to measure? Are they reliable? These questions will be answered in another chapter.

Chart 3. Proposed Correlations between the Teachers' Marks in Five Subject Areas and Total Scores on Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, and Scores on the Terman-McNemar Test of Mental Ability.

Subject	Iowa Every-Pupil Tests of Basic Skills	Terman-McNemar Test of Mental Ability
Arithmetic	x	x
History	x	x
Geography	x	x
Literature	x	x
Language	x	x

Other correlations as shown in Chart 3 were to be computed between Teachers' marks in the five subject areas discussed in this study and the total results on the Iowa Every-Pupil Tests of Basic Skills, Form N. Still further correlations were to be made between Teachers' marks in the five subject areas and the scores obtained on the Terman-McNemar Test of Mental Ability.

One other correlation was to be made between the total scores on sub-tests of the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B and the scores obtained on the Terman-McNemar Test of Mental Ability.

AN ANALYSIS OF
IOWA EVERY-PUPIL TESTS OF BASIC SKILLS, FORM N, TEST B

The Iowa Every-Pupil Tests of Basic Skills is designed to provide measurements in grades 3 through 9. Skills in reading, work-study, language, and arithmetic are involved.

The main purposes of the test are to help teachers and supervisors to become better acquainted with the achievement and capabilities of the pupils and for the purpose of evaluating school procedures. This knowledge helps the school officials to adapt instruction to needs and to guide pupils more effectively. Test results should be helpful in the motivation of both teacher and pupil to increased effort in teaching and learning.

There are four forms of the test which means that annual testing can be carried on without repeating a test. A cumulative record gives a clear picture of the development of each child.

Test B, the test on work-study skills, which is composed of five parts is the test being analyzed in this study. The skills tested are map reading, use of references, use of an index, use of the dictionary, and the reading of graphs, charts, and tables.

The time required for the administration of this test is about 90 minutes. It is possible to give it at one sitting or at two sittings of 45 minutes each.

Other tests of the battery are: Test A, Test of Silent Reading; Comprehension; Test C, Test of Basic Language Skills; and Test D, Test of Basic Arithmetic Skills.

General Characteristics of the Complete Battery

The authors of this battery of tests recognize the fact that "one of the principal values of testing lies in the use of test results in the diagnosis and treatment of the individual pupil".[1] The description of the pupil must be analytical, specific, and dependable.

The authors have attempted to identify those skills which are most important to school achievement and have proceeded to build reliable tests for each skill. Length of test has not been considered. There are 15 skills tested with ample time given for the testing of each.

Commonly used principles of test validation have been applied to the selection of test items. Analysis of courses of study, textbooks, and instructional procedures have been made. There has been extensive research by the authors. All items have been selected for their cruciality and discriminating power. They have been tried out before being made a part of the test. All tests have been judged by a group of authors who have had experience in constructing and validating test materials. Their judgment has been pooled for final validation.

Throughout the battery emphasis has been placed upon the functional values of the skills to be taught. The testing situations have been made as close to actual situations as possible.

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[1] Manual of General Information, Houghton Mifflin Company, Boston, 1947, page 8.

Norms have been provided for the battery of tests. These norms are to serve two purposes. One purpose is to facilitate the interpretation of test results and the other is to make it possible to compare scores made in different tests.

The authors do not claim that the norms given for this battery are representative of country-wide achievement but that they compare favorably with those of other standardized achievement tests on the market.

If norms are to be used for comparison they must be established on the same pupils and under the same conditions. The norms for each of the tests and sub-tests in either battery "were established for exactly the same group of pupils and schools, all tested at the same time and under the same very carefully controlled conditions".[1]

"The norms for Forms L, M, N, and O of the Iowa Every-Pupil Tests of Basic Skills were derived from the Iowa Every-Pupil Basic Skills Testing Program for 1940, 1941, 1942, and 1943."[2]

Fifty thousand pupils were selected as the sample on which the norms were to be established. There were four samples used with a total of 196,851 pupils. These pupils were located in more than 350 different school systems. The number of schools represented is more important than the number of pupils.

These schools were located in communities ranging in population from a few hundred to more than 200,000. All were graded

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[1] Manual of General Information. Houghton Mifflin Company, Boston, 1947, page 12.

[2] Ibid, page 13.

schools; the majority were located in Iowa, although 60,600 pupils were located in schools in eleven states of the Middle West. While the resulting norms may be Midwestern, they are as representative of nation-wide achievement as are the national norms on standardized tests.

Four types of norms are given for the battery. They are: (1) grade norms, (2) percentile norms, (3) age-at-grade-norms, and (4) chronological age norms.

"A grade norm is an estimate (based upon a sample) of the median score for all pupils in a given grade." These may be established for each grade as well as for each month of the grade.

"An age-at-grade norm is an estimate of the median score for all pupils of a given age within a given grade."

"A percentile norm within a grade is an estimate of the score below which a given per cent of the pupils in a given grade would fall."1/

All above norms are for individual achievement. In addition to the above defined types of norms the Iowa Every-Pupil Tests of Basic Skills have provided special norms known as norms for school averages. They are of the percentile-within-grade type. They indicate for each grade and for each part of the tests separately.

They also give the values below which given percentages of average scores fall for the schools participating. These norms

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1/ Manual of General Information. Houghton Mifflin Company, Boston, 1947, page 14.

can be established only in a program involving many schools and in this respect the Iowa Every-Pupil Tests of Basic Skills are unique.

Tables are given for the conversion of raw scores to grade-equivalents as well as for Percentile Grade Norms.

The authors recommend the use of Percentile grade norms in the interpretation of test results.

It is also recommended that age-at-grade norms be used in the analysis of individual pupil results, particularly in the case of retarded or accelerated pupils. Tables are given for all forms as well as for all sub-tests of these forms.

Chronological age norms for these tests "were derived by fitting the chronological age scale to the grade-equivalent scale"[1]. A table is given presenting the age equivalent of each possible grade equivalent from 20 to 109 inclusive.

Although no special claims for the dependability of the age norms are made by the authors, it is felt that they are as dependable as age norms provided for most current test batteries. The age norms for these tests should not be taken too literally or accepted at face value but should be considered crude estimates of true age norms.

The authors advise the use of age-at-grade norms instead of chronological age norms because, in their estimation, these are more dependable and meaningful.

The norms for school averages are based upon school results rather than upon individual results. There are two percentile

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[1] Manual of General Information. Houghton Mifflin Company, Boston, 1947, page 28.

norm tables, each of which has its own purpose. Percentile grade norms are used with individual pupil results and the norms for school averages with building results.

All average grade-equivalents for school averages are carried to one decimal place in order that they may be more significant.

The importance of keeping an individual cumulative record for each pupil is emphasized. These may be used for comparing both individual and class development.

Reliability Data

More than 300 school systems took part in the standardization program for Form N of the Iowa Every-Pupil Tests of Basic Skills. Fifteen representative schools were chosen to provide the sample used in computing the reliability coefficients. Fourth and seventh grades were used. All papers were passed in and a sample of 300 was selected for each grade.

These reliability coefficients were figured by means of the Spearman-Brown prophecy formula from correlations between scores on odd-numbered and even-numbered items.

A table in the Manual of General Information presents the reliability data for the tests in the Advanced Battery. The reliability coefficients for the seventh grade sample selected from 15 schools for Test B of Form N are as follows:

Part I	+.85
Part II	+.74
Part III	+.87
Part IV	+.82
Part V	+.68
Total	+.95

The table from which the above reliability coefficients were taken is made up of two columns. The left-hand column includes those reliability coefficients which were computed on the results of a single seventh grade class in a single school while the right-hand column includes those reliability coefficients which were computed on the results of a sample selected from 15 representative schools. Of this table the authors say:

> The higher values of the coefficients in the right-hand half of the table have already been explained as due to the greater heterogeneity of the samples involving several schools. Also, the coefficients in the right-hand half of the table are more nearly comparable to those reported for most current standardized tests, although many of the reliabilities reported for such tests were computed for samples drawn not only from several schools but from several grades as well.[1]

"These tests are directly concerned only with certain basic skills and abilities, and are not intended to measure total achievement in any given subject or grade."[2]

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[1] Manual of General Information. Houghton Mifflin Company, Boston, 1947, page 63.

[2] Ibid, page 53.

AN ANALYSIS OF
TERMAN-McNEMAR TEST OF MENTAL ABILITY

The Terman-McNemar Test of Mental Ability is a revision of the Terman Group Test of Mental Ability which was first published in 1920. It was one of the first tests based upon item analysis.

The test is written for use in Grades 7 through 12 but can be used in Grade 6 and also in first year of college. There are two forms, C and B. Each form is composed of seven sub-tests containing 162 items.

Several changes have been made to make the new forms superior to the original. Among these changes are: (1) More reliable multiple-choice type questions have replaced the two-choice questions. (2) A patented perforated scoring key has been designed for rapid scoring. (3) The test has been made more highly saturated with the common factor, general verbal intelligence through using more homogeneous material. (4) There are seven sub-tests instead of ten as in the original form. These are: Information, Synonyms, Logical Selection, Classification, Analogies, Opposites, and Best Answer. (5) There is less repetition in the use of a word as a stimulus or response. Equivalent material as far as possible has been used in both forms.

As many of the original items as possible were retained in the revision. Other items were added after 1200 pupils in Grades 7, 9, and 11 had been given the three experimental forms, carefully edited, by seven competent persons. Items which did not differentiate between groups of different maturity levels were

eliminated. "The average per cent passing an item for the three grades was used as the final measure of item difficulty."

To insure further validity of items used the tetrachoric correlation of each item with the total score based on all three test forms was computed for each grade separately. The average tetrachoric for the three grades was taken as the final item validity or measure of internal consistency. The average correlation for all retained items was +.53.

Items within subtests were arranged in order of difficulty thus keeping the new forms, like the old, power tests. Forty-eight minutes is required for administering the test, including time for directions.

Equivalence between the old test and the new test was established by administering the old Form A and the new Form C to 1400 pupils in Grades 7 through 12 in Portsmouth, New Hampshire. Equivalent raw scores were determined from these results.

Another controlled rotated group experiment was carried out in Concord, New Hampshire, where the new Forms C and D were given to 1500 pupils in Grades 7, 9, and 11. The analysis of the data showed the two forms to be completely comparable throughout the range of scores.

Three common methods of finding reliability were employed: the split-half reliability coefficient, the inter-form coefficient, and the probable error of a test score.

The split-half reliability coefficient for the Terman-McNemar Test of Mental Ability was+.96 when determined on 279 cases in

Grades 7 and 9 in Portsmouth, New Hampshire.

When determined on 239 cases in Grades 7 and 9 in Concord, New Hampshire, the inter-form reliability coefficient was +.95.

The reliability coefficient by both methods for age 14, (13-6 to 14-5) which was used as a basic age for setting up the standard score scale, was +.96.

As a third determiner of reliability the Probable Error of Measurement was given. One advantage of this method is that it is independent of the range of talent upon which it is based, whereas the reliability coefficient is not. The Probable Error of Measurement for the Terman-McNemar Test of Mental Ability is approximately 2.2 standard score points for the entire age range covered by the test.

The best evidence of the validity of the test is found in its successful use during the years since it was first given. It has been used in both guidance and administration. The correlation between the old test and the new test is +.91. This indicates that both forms are measuring the same basic abilities.

For the Terman-McNemar Test of Mental Ability, a standard score scale has been devised which uses the median of the 14-year age group of the national standardization population as the origin and the standard deviation of this age group, arbitrarily made 16 points, as the unit of measurement.

This fulfills the requirements for an adequate mental measurement, a score scale with a single origin and comparable units in all parts of the scale.

The standard scores were converted from raw scores by using

the Otis Normal Percentile Charts. These scores were determined on a 10 per cent random sampling from a total population of 16,000 14 year-old pupils in all parts of the United States.

Norms for the Terman-McNemar Test of Mental Ability were determined in the customary way. They were established through the co-operative national testing program carried out by the World Book Company. Approximately 190,000 tests were distributed to 200 cummunities in 37 states and 307 parochial schools in the Philadelphia diocese. A 10 per cent random sampling of the test booklets was used in setting up the norms. All scoring and tabulating for this sample was done by the World Book Company. Distributions of raw scores for separate age groups were the basic data for establishing the standard score scale and the norms.

Three grades were tested in each community which should insure a cross section of the school population in the grades involved in the norms.

Scores may be interpreted in any one of four ways. These are:

1. Normalized standard scores
2. Mental ages
3. Deviation IQ's
4. Percentile ranks corresponding to IQ's

The method used is determined by the purpose for which the test scores was given.

Deviation IQ's is the method chosen for interpreting scores where an Intelligence Quotient score is required. This IQ is found by finding the difference between the obtained standard

score and the average standard score for other individuals of the same age. This deviation is interpreted from Table 3 which gives all the Deviation IQ's corresponding to given deviations of standard scores from the norm.

Directions are given for finding the IQ for any individual without arithmetical computation.

Percentile Ranks are seldom used. Table 4 of the Manual gives the necessary information if they are used.

Mental Ages are figured from Table 2 and are used only when figuring for ratio IQ's which are seldom used.

In the utilization of results on the Terman-McNemar test, each method has its own interpretation.

Standard scores are preferable to raw scores but deviation IQ's are superior to standard scores.

Uses for mental ages are limited. They may be employed for determining the promotion or retardation of a pupil.

The deviation IQ serves the purpose when a measure of brightness is desired. This IQ has many uses. It may be used to determine the potentialities of pupils, to determine promotion or grouping, and in guidance.

Percentile rank is used rarely in the interpretation of Terman-McNemar results. It may be used when comparing achievement results with intelligence test results.

As the sub-tests are so short, no provision has been made for the interpretation of scores.

Cumulative records are advised as a guide for future reference.

Very clear, concise directions are given for administering the test. Time limits are ample but not over-generous. Directions are given for scoring with the patented scoring devise and also for machine scoring with the International Test Scoring Machine.

Description of the Group

A sampling of 210 eighth-graders was chosen for this study, 101 boys and 109 girls. They form a cross section of the eighth grade population as they represent all nationalities and come from all types of homes. They were chosen from sixteen elementary schools from all sections of the city and include slow, average, and superior pupils.

All data used in this study was obtained from the Individual Cumulative Record Sheets. These were made available by the principals of the buildings. From these records were taken the Intelligence Scores, the teachers' marks for the year and scores on the sub-tests of the Iowa Every-Pupil Tests of Basic Skills Form N, Test B, as well as the totals.

In November 1946 the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, was given to the eighth grade in the school system of Manchester, New Hampshire. They were given for several reasons. In the first place, they were given to check on the results of teaching procedures in study skills in order to determine if pupils were being taught study skills and, if so, how well. If the results showed that teaching procedures had not been effective the necessity for a different technique would be apparent. Finally, were the pupils applying their

knowledge of study skills?

The Terman-McNemar Test of Mental Ability had been given to these same pupils in October of 1946 as it is given every year to the eighth grade in this school system. The Intelligence Scores for this group ranged from a low of 67 to a high of 149.

Teachers' marks, which had been given quarterly, were averaged for the year 1946-1947. The marks had been given by sixteen different teachers.

After the Iowa Test had been administered the test papers were scored and the scores for the sub-tests as well as the total scores were recorded on each pupil's record sheet. Here again the correcting and scoring had been done by the same sixteen teachers.

Procedure for Collection of Data

When gathering this data the writer made out individual cards on which were recorded the name of the pupil, the scores on the sub-tests of the Iowa Tests of Basic Skills, the total of these sub-tests, the Intelligence Score, the quarterly marks given by the teachers in arithmetic, geography, history, literature, and language as well as averages of these marks.

An all-purpose table was then made making all data readily accessible.

STATISTICAL TREATMENT OF DATA

Correlations were computed by employing the Pearson Product-Moment technique as found in Garrett.[1/] Scattergrams were made, means computed, and correlation coefficients found. Standard Deviations were found for all means. Standard Errors were computed for all correlation coefficients and for Standard Deviations.

Sixteen correlations were found between teachers' averages of percentages in arithmetic, history, geography, literature, and language and scores on the sub-tests of the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B. Map Reading scores were correlated with averages in geography; Use of References with history, geography, and language; Use of Index with history, geography, literature, and language; Use of Dictionary with history, geography, and literature; and Reading Graphs, Charts, and Tables scores with averages in arithmetic, history, geography, literature, and language. The lowest of these correlation coefficients was +.377 between Reading Graphs, Charts, and Tables and history. The highest was +.752 between Reading Graphs, Charts, and Tables and arithmetic.

These correlations were computed to find out what relation, if any, existed between averages of teachers' marks in the school subjects mentioned above and the sub-tests of the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B. If the correlations were high, some significance was evident; if low, no significance was noted.

1/ Henry E. Garrett, Statistics in Psychology and Education, Longmans, Green and Company, New York, 1944, page 270.

Five correlations were computed between averages of Teachers' marks in arithmetic, history, geography, literature, and language and total scores on the sub-tests of the Iowa Every-Pupil Tests of Basic Skills, Form F, Test B. These ranged from a low of +.555 between history averages and total test scores to a high of +.676 between language averages and total sub-test scores. All of these correlations coefficients show more or less marked relationships.

Five correlations were computed between the scores obtained on the Terman-McNemar Test of Mental Ability and averages of teachers' marks in arithmetic, history, geography, literature, and language. These were found to range from +.516 between Intelligence Scores and teachers' marks in arithmetic to +.665 between Intelligence Scores and teachers' marks in language.

Ten intercorrelations were computed between the sub-tests themselves. A wide range was noted with the greatest relationship being between Map Reading and Use of Index with a coefficient of +.827. This was very significant.

The correlation coefficient between Intelligence Scores of the Terman-McNemar Test of Mental Ability and the Total Scores on the sub-tests of the Iowa Every-Pupil Tests of Basic Skills, Form F, Test B was +.708 which compares favorably with + .75 found by Lanigan[1] between Work-Study Skills Form N, Test B, of the Iowa Every-Pupil Tests of Basic Skills and scores on the Otis Intelligence Test.

All 37 correlation coefficients were positive. Ten of

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[1] Mary A. Lanigan, "Pupil Performance on the Iowa Every-Pupil Tests of Basic Skills Administered at Half-Year Intervals in Junior High School."

these were +.60 or more, showing a marked significance between measures being correlated; twelve were between +.50 and +.60 while fifteen were below +.50 and showed little, if any, relationship between measures correlated.

These correlations will be compared with those found in other reports.

Summary

This study is concerned with relationships between scores on the Work Study Skills Test of the Iowa Every-Pupil Tests of Basic Skills, Form N and teachers' marks in arithmetic, history, geography, language, and literature and Intelligence scores obtained on the Terman McNemar Test of Mental Ability.

Means were computed for the entire group in the Iowa Every-Pupil Tests of Basic Skills, the Terman-McNemar Test of Mental Ability, and for teachers' marks in arithmetic, history, geography, language, and literature as well as standard deviations for each mean.

Correlations between each of the test instruments and each of the five subject fields were computed.

Tables and interpretation of this data will be found in the following chapter.

CHAPTER IV

FINDINGS AND INTERPRETATIONS

This study is based on a sampling of 210 eighth graders, a cross-section of the total eighth grade population of Manchester, New Hampshire.

Criteria used in this study were intelligence scores obtained from the Terman-McNemar Test of Mental Ability, the individual sub-test scores and total scores on the Iowa Every-Pupil Tests of Basic Skills Form N, Test B, and Teachers' marks in arithmetic, history, geography, literature, and language.

The statistical technique employed coefficients of correlation figured by the Pearson Product-Moment formula in analyzing the data.

These coefficients of correlation were interpreted according to the Absolute Scale as found in Guilford[1].

Table 1. Means and Standard Deviations of the Three Variables Used with the 210 Eighth-grade Pupils.

Test	M	σ_m	σ	σ_σ
Terman-McNemar (I.Q.)	103.1	±1.042	15.10	±0.737
Iowa Basic Skills (Total)	84.2	±1.173	17.00	±0.830
Teachers' Marks (Average)	81.0	± .959	13.89	±0.678

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[1] Guilford, J. P. Fundamental Statistics in Psychology and Education, McGraw-Hill Company Inc., New York, 1942, page 219.

TABLE 1

Table 1 shows the mean intelligence score of the group in the Terman-McNemar Test of Mental Ability to be 103.1 with a Standard Deviation of 15.10. This means that 68% of the scores should fall between 118.2 and 88 if the distribution is normal. Approximately 80% of the scores of this group fall within this range which may be due to a heterogeneous grouping.

The mean score of the group in the Iowa Every-Pupil Tests of Basic Skills Form N, Test B, total scores is 84.2 and the Standard Deviation 17. Sixty-eight per cent of the scores should fall between 101.2 and 67.2 if the distribution is normal. However, approximately 73% of the scores fall in this range providing further evidence that the group is heterogeneous rather than homogeneous.

The mean average for the group in teachers' marks is 81 with a Standard Deviation of 13.89. Between 94.89 and 67.11 we should find 68% of the averages whereas approximately 98% of the averages fall within this range. The scores do not make a normal distribution. Here again, the group is shown to be a cross-section and heterogeneous.

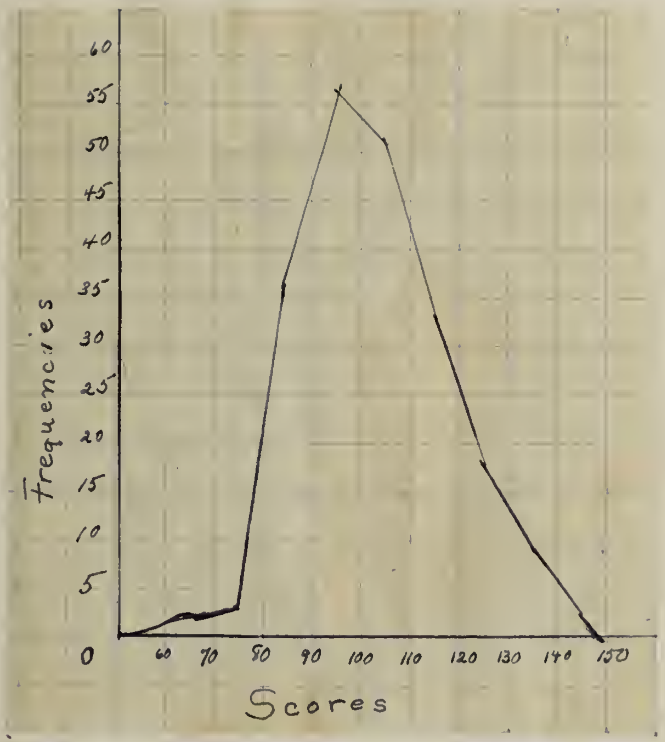

Figure 1. Frequency Distribution of the 210 pupils on the basis of the Terman-McNemar I Q scores.

Figure 1 points out the fact that more than one-half the intelligence scores fall between 90 and 110 as obtained from the Terman-McNemar Test of Mental Ability. The range of intelligence scores for the 210 pupils is from a low of 67 to a high of 149 with a mean score of 103.1

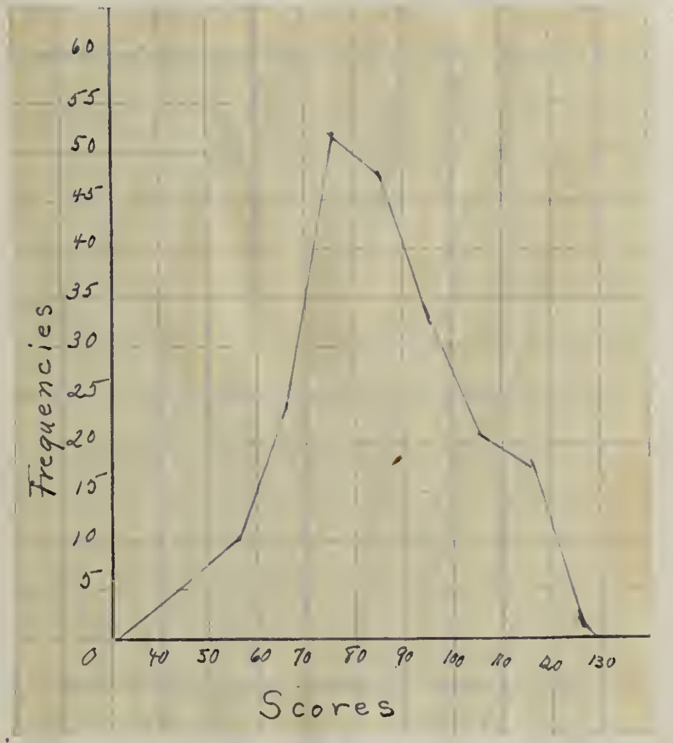

Figure 2. Frequency Distribution of the 210 pupils on the basis of Iowa Sub-test scores.

In Figure 2 more than one-half the scores as found on the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, are grouped in the interval between 70 and 80. The distribution is similar to that in Figure 1 showing intelligence scores. The range of scores shown in Figure 2 is from 47 to 121, with a mean score of 84.2.

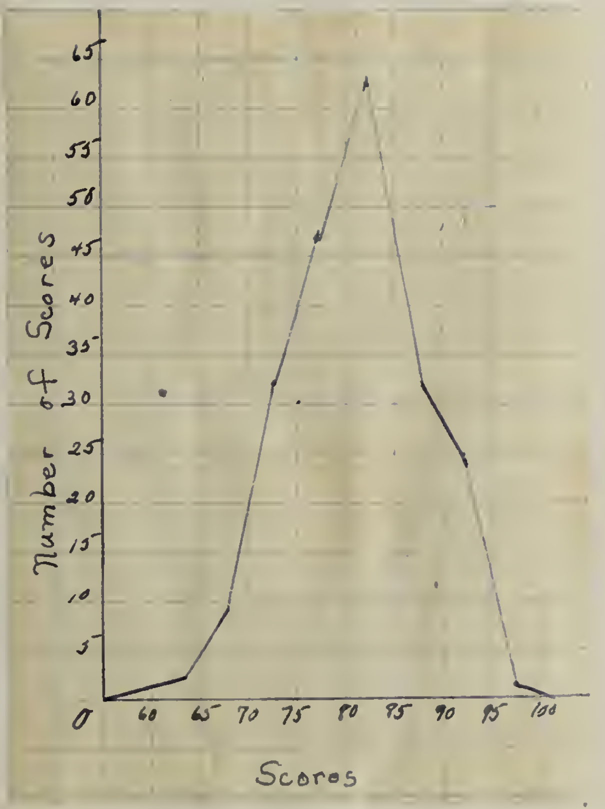

Figure 3. Frequency Distribution of the 210 pupils on the basis of averages of Teachers' marks for year.

Figure 3 shows a similar distribution to Figures 1 and 2 in that the bulk of the scores is between 75 and 85 and centered about the mean of 81.0. The averages of Teachers' Marks on this distribution range from 64 to 95.

Table 2. Correlations Between the Teachers' Marks in Five School Subjects and Total Scores on Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, and Scores on Terman-McNemar Test of Mental Ability.

Subject	Iowa		I Q	
	r	σ_r	r	σ_r
Arithmetic	+.653	±.04	.577	.05
History	+.555	±.05	.564	.05
Geography	+.613	.04	.526	.05
Literature	+.567	.05	.615	.04
Language	+.676	.04	.665	.04

Table 2 shows that the relation between Intelligence scores and school achievement ranges in correlation coefficients from +.52 to +.67 with an average of +.57. This compares favorably with a study by Gates[1] in which he found correlation coefficients ranging from +.47 to +.65 with an average of +.54. This study was carried out with elementary school pupils.

All correlation coefficients between school subject areas and the two tests are positive and range from the lowest coefficient of +.52 between arithmetic and Terman-McNemar intelligence scores to +.67 between language and the Iowa Basic Skill sub-test scores.

All the correlation coefficients show a moderate degree of significance. Those most significant in relation to the Iowa Every-Pupil Tests of Basic Skills are language with a correlation coefficient of +.676 and arithmetic with a correlation coefficient of +.653.

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[1] Gates, A. I. "The Correlation of Achievement in School Subjects with Intelligence Tests and Other Variables," *Journal of Educational Psychology*, 1922, 12, 129-139, 223-235, 277-285.

Table 3. Intercorrelations of Sub-tests of Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, Given to 210 Eighth-graders.

Sub-test	I	II		III		IV		V	
		r	σ_r	r	σ_r	r	σ_r	r	σ_r
I Map Reading		+.718	±03	+.821	±.02	+.523	±.05	+.555	±.05
II Use of References				+.459	±.05	+.527	±.05	+.454	±.05
III Use of Index						+.638	±.04	+.467	±.05
IV Use of Dictionary								+.431	±.06
V Reading Graphs, Charts, Tables									

Table 3. The intercorrelations of the sub-tests of the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B show a range of +.431 between Use of Dictionary and Reading Graphs, Charts, Tables to a correlation of +.827 between Map Reading and Use of Index. The most significant correlation coefficient is the +.827 between Map Reading and Use of Index which shows a repetition or sameness of the skills tested. The coefficient of + .718 between Map Reading and Use of References is higher than the other sub-test correlations. These correlations show that the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, are measuring what they purport to measure.

Table 4. Correlations Between Total Scores on the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B and Teachers' Marks in Five School Subjects.

Subject	r	σ_r
Arithmetic	+.653	±.04
History	+.555	±.05
Geography	+.613	±.04
Literature	+.567	±.05
Language	+.676	±.04

Table 4 gives the coefficients of correlation between the Total Scores in the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B and Teachers' Marks in arithmetic, history, geography, language, with literature. The most marked coefficient is +.676 in language, with arithmetic approaching with a coefficient of +.653 while history is the lowest with a coefficient of +.555. All these coefficients show a moderate relationship.

Table 5. Correlations Between the Intelligence scores on the Terman-McNemar Test of Mental Ability and Teachers' Marks in the Five School Subjects.

Subject	r	σ_r
Arithmetic	+.516	±.05
History	+.564	±.05
Geography	+.526	±.05
Literature	+.615	±.04
Language	+.665	±.04

Table 5 gives the correlation coefficients between intelligence scores as obtained on the Terman-McNemar Test of Mental Ability and teachers' marks in arithmetic, history, geography, literature, and language. The greatest relationship is between language and intelligence and the lowest is between arithmetic and intelligence, +.665 and +.516 respectively. All correlations show a low to moderate degree of relationship.

Correlations between the sub-tests of the Iowa Every-Pupil Tests of Basic Skills Form N, Test and Teachers' Marks in chosen subject areas show coefficients ranging between a low of + .377 between history and reading graphs, charts, and tables and a high of +.752 between arithmetic and Reading graphs, charts, and tables.

Other correlations were found. The correlation coefficients are listed below:

Map Reading and geography	+.493
Use of References and history	+.378
Use of References and geography	+.378
Use of References and language	+.436
Use of Index and history	+ .50
Use of Index and geography	+.533
Use of Index and literature	+.504
Use of Index and language	+.554
Use of Dictionary and history	+.448
Use of Dictionary and geography	+.454
Use of Dictionary and literature	+.491
Reading Graphs, Charts, Tables and arithmetic	+.752
Reading Graphs, Charts, Tables and history	+.377
Reading Graphs, Charts, Tables and geography	+.402
Reading Graphs, Charts, Tables and literature	+.464
Reading Graphs, Charts, Tables and language	+.465

One other correlation coefficient of +.708 was found between total scores on Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, and intelligence scores of the Terman-McNemar Test of Mental Ability. This is significant in that it shows a moderately high relation between intelligence and achievement in study skills.

These correlation coefficients are all positive but of low to moderate significance.

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SUMMARY

Central tendencies and distributions of the group for each of the three criteria used were computed and frequency polygons were made in order to give a graphic description of the group.

Correlative studies, based on averages of teachers' marks in the five subject areas with each of the two test instruments used were found. All correlations were positive and more or less marked ranging from +.517 to +.676.

Only one coefficient of correlation showed that two tests were measuring about the same skills. This was the coefficient found between Map Reading and Use of Index.

Language showed a marked significance when correlated with both intelligence and achievement.

The most significant correlations between Iowa Every-Pupil Tests of Basic Skills, Form N, Test B total scores and Teachers' marks were in arithmetic and language.

Teachers' marks in lnaguage and literature correlated highest with intelligence scores.

Correlations between sub-test scores and teachers' marks in chosen fields showed the most significant to be between Reading Graphs, Charts, and Tables and arithmetic. This seems a logical relation.

On the whole, coefficients of correlations were low to moderate and significant enough to show that real relations exist.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this study was to determine the relationships between scores on the sub-tests of the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, on Work-Study Skills and teachers' marks in arithmetic, history, geography, literature, and language.

Research showed that there was much incidental teaching of study skills and that it was without value. It showed that intelligence and achievement are related and that teachers' marks are, on the whole, a reliable estimate of school achievement.

From the research and statistical procedures the following conclusions are drawn:

1. There is a significant correlation between intelligence scores and total scores on the sub-tests of the Iowa Every-Pupil Tests showing that pupils are achieving in proportion to their capacity.
2. There is evidence that study skills are taught in the schools included in this study.
3. There is evidence that the marks given by teachers in the schools included in this study are reliable.
4. There is a slightly higher correlation between skills scores and teachers' marks than between intelligence scores and teachers' marks.
5. Teachers' marks in separate subjects correlate to a moderately high degree with intelligence scores.
6. Study skills should be taught directly and not left to incidental learning.
7. With one exception, low correlations were found between the sub-tests of the Iowa Every-Pupil Tests of Basic Skills,

which show that they measure what they purport to measure.

8. The correlation between map reading and use of index was very high, which shows that both tests are measuring the same skills.

The study shows that the Iowa Every-Pupil Tests of Basic Skills, Form N, Test B, in the main, tests what it purports to test and that there is a moderate correlation between sub-test scores and teachers' marks.

CHAPTER VI

LIMITATIONS AND PROBLEMS FOR FURTHER RESEARCH

The scope of this study has been limited to study skills and their relation to intelligence and to teachers' marks. Some further studies may be worked out on the basis of this same data and related fields.

1. A study to determine the value of reference material in the teaching of work-study skills by means of an experimental and a control group.
2. A study based on the results of the present study to determine the reasons for success in those schools ranking highest in work-study skills.
3. A survey of material related to work-study skills.
4. Construction of a manual of detailed remedial help in work-study skills.

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TERMAN–McNEMAR TEST OF MENTAL ABILITY

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MANUAL OF DIRECTIONS

I. Description of the Tests

The Terman Group Test of Mental Ability, which was first published in 1920, was not only one of the earliest group tests but also one of the first tests based upon an item analysis. Perhaps its fundamental soundness is indicated by its widespread and continued usage — more than 11,000,000 copies have been distributed during the period 1920–1941. This test has now been completely revised and will be known hereafter as the Terman-McNemar Test of Mental Ability.

The test is designed primarily for use in Grades 7 through 12, although it may be used also in Grade 6 and with first-year college students. There are two forms, C and D, each composed of seven subtests and 162 items.

The several considerations which have led to and influenced the revision should make the new forms definitely superior to the original. The changes may be briefly mentioned here. (1) Two-choice questions have been eliminated in favor of the more reliable multiple-choice type with five alternatives except for the Best Answer test, which has four. (2) The revised forms are so designed as to permit more rapid scoring by a perforated key;[1] they may also be used with separate answer sheets for scoring on the International Test Scoring Machine. (3) More homogeneous material has been used in order to have a test more highly saturated with a common factor or ability. Thus, the exclusion of the arithmetical and numerical subtests means that the scores of any two individuals are more nearly comparable qualitatively; i.e., they lie along the same continuum. This continuum may be characterized as that of general verbal intelligence. This particular change has, of course, been prompted by recent developments in factor analysis. (4) Instead of ten subtests, each form of the new test contains seven: Information, Synonyms, Logical Selection, Classification, Analogies, Opposites, and Best Answer. It will be noted that Sentence Meaning, Mixed Sentences, Arithmetic, and Number Series have been dropped, and that the former Same-Opposites test has been replaced by two subtests, Synonyms and Opposites. (5) An attempt has been made to use equivalent materials in the two forms, and within each subtest the use of a word either as a stimulus or response more than once has been reduced to the vanishing point.

II. Construction of the Tests

Item analysis. In constructing the new forms, as many of the items from the old forms as could be made suitable by revision were utilized. Additional items were made up until enough were available, after critical examination by seven competent persons and after careful editing, for three experimental forms of the same length and general make-up as the present Forms C and D. These forms were administered to experimental groups in Grades 7, 9, and 11, each pupil taking all three forms and practice effect being taken care of by rotation in the order of administration. Ample time limits were allowed for even the slowest. Enough pupils were tested so as to yield 400 cases, with complete data, for each grade. The results for these 1200 pupils were used as the basis of the subsequent item analysis.

On the assumption that the validity of an item depends partly upon the extent to which it differentiates between groups of different maturity levels, those items were eliminated which did not show successive increments from Grades 7 to 9 to 11, in the percentages giving correct responses. The per cent passing a test item was considered as the item difficulty for each grade. The average per cent passing an item for the three grades was used as the final measure of item difficulty. As a further basis for eliminating the less valid and unsatisfactory items, the tetrachoric correlation of each

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[1] The arrangement for scoring is covered by Patent No. 1,586,628 originally taken out by Charles A. Lauterbach.

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item with the total score based on all three test forms was computed for each grade separately. Three such coefficients were available for all items except those which were so easy for the 11th grade and the ones so difficult for the 7th grade as to yield dichotomies too extreme for stable tetrachoric correlation coefficients. The average tetrachoric for the three grades was taken as the final item validity or measure of internal consistency. Items yielding low average validity coefficients were eliminated from further consideration. No item was retained which yielded an average tetrachoric correlation of less than .30, and only 10 per cent of the final items have validities of less than .40. The average coefficient for all retained items was .53.

The final allocation of the items to the two forms was made on the basis of item difficulty and item validity, the items within each subtest and for the total test being matched in the two forms for difficulty and validity indices. The respective averages of all the difficulty values for Forms C and D were 56.24 per cent and 56.26 per cent, while those of the validity coefficients were .5308 and .5307. Since the matching also produced highly similar distributions of difficulty indices and distributions of validity coefficients for the two forms, the statistical comparability of Forms C and D has been assured.

The items within each subtest have been arranged in the order of difficulty indicated by the difficulty indices. This fact, coupled with ample time allowance for each subtest, means that the new forms, like the old, are essentially power tests — any pupil who has not finished a subtest within the set time limit would not likely increase his score if given additional time. The time needed for administering either form, including time for directions, is about 48 minutes.

Perhaps a word should be said here for the benefit of the non-statistically-minded test user. If the types of subtests included in the Terman-McNemar revision are acceptable as valid measures of important mental abilities, a matter that is hardly open to debate in view of the abundance of experience favoring this assumption, then the above data are convincing evidence of the essential soundness of the content of the new tests.

Comparability of old and new forms. When an established test such as the Terman Group Test of Mental Ability is revised and new norms established, it is essential to provide the means by which the scores on the original test can be interpreted in terms of the new norms. To be able to do this, it is necessary to determine the equivalence of scores on the old and new tests. To establish this equivalence, a carefully controlled equating experiment was carried out involving the administration of old Form A and new Form C to all students in Grades 7 through 12 in Portsmouth, New Hampshire. Approximately 1400 cases spread fairly equally over the grade range were included in this study. Practice effect was equalized by giving Form A first to a random half of each grade group; the remaining pupils took Form C first. A few days later the second test was given. Those who took Form A at the time of the first testing now took Form C, and vice versa. On the basis of these data the equivalent raw scores on the old and new tests were determined. These data are summarized in Table 5, with the exception that standard scores on the new test have been substituted for raw scores.

Comparability of the new forms. As indicated earlier, new Forms C and D were paired for difficulty in terms of the average per cent passing each item. As a final check on the equality of forms and also to determine reliability coefficients, another controlled rotated group experiment was carried out. The testing was done in Concord, New Hampshire, and approximately 1500 students in Grades 7, 9, and 11 were included. The analysis of these data showed the two forms to be completely comparable throughout the range of scores.

Reliability. The reliability of a test is the stability of the measures it yields. A completely unreliable test would be one which yielded measures so variable that just as good results could be obtained by drawing lots; a completely reliable test would be one in which a single application of the instrument yielded the individual's "true" score. Reliability is a function of the test itself — that is, the number and kind of items presented to the person being tested under standard conditions. It has nothing to do with the norms established for the test. In other words, a completely reliable test might give misleading results if the norms were improperly established.

Various methods of expressing the reliability of a test are in common use. Three of the commonest are the split-half reliability coefficient, the interform reliability coefficient, and the probable error of a test score. All three methods have distinct advantages and all three methods have been employed in the case of the Terman-McNemar Test of Mental Ability for the sake of completeness.

1. The split-half method. The split-half reliability coefficient is obtained by scoring all the odd-numbered items and all the even-numbered items separately. By doing this the test is broken into two parts which are presumably equal in every sense. Even the effects of fatigue, ennui, and

practice are evenly shared under these circumstances. The two scores thus obtained are then correlated, and the obtained coefficient is "corrected" by means of a statistical formula to estimate the reliability coefficient of the full-length test.

2. The inter-form method. In the case of the inter-form reliability coefficient two presumably equivalent forms of the test are given to the same children, with an interval varying from one day to a fortnight between the testing periods. The obtained scores on the two tests are then correlated to find the reliability coefficient. It is readily seen that reliability coefficients obtained in this manner are influenced by the equivalence of the two test forms (not in the sense of difficulty, but in the sense of comparable content) and the variations in the total environment including the person tested. Consequently, the inter-form reliability coefficient is almost always lower than the corrected split-half reliability coefficient. On the other hand, it has the virtue of representing with more veracity the situation which the practical school administrator most often faces — namely, the question of how much variation (not due to practice) must be expected when a different form of a test is used.

Both types of reliability coefficients are difficult for the novice to interpret. They vary in accordance with the range of talent tested, and unless the group on which the coefficients are based is clearly specified, the coefficients themselves are of doubtful significance. Perhaps the most unambiguous population on which to base such coefficients is a random sample of a single age group. The split-half reliability coefficient for the Terman-McNemar Test of Mental Ability was .96 when determined on 279 cases in Grades 7 through 9 in the carefully controlled experiment in Portsmouth, New Hampshire, in which Forms A and C were equated. The inter-form reliability was .95 when determined on 239 cases in Grades 7 and 9 in the Concord, New Hampshire, experiment in which Forms C and D were equated. When the reliability coefficients so obtained are corrected for range to give the coefficient for age 14 (13–6 to 14–5) which was basic in setting up the standard score scale, the reliability by both methods is .96. The reliability coefficients for the other age ranges were checked and found to vary only slightly from the 14-year value.

3. Probable Error of Measurement. The third method of reporting the reliability of a test is to give the Probable Error of Measurement.[1]

One advantage of the Probable Error of Measurement is that it is independent of the range of talent upon which it is based, whereas the reliability coefficient is not. Another is that it makes it possible for us to estimate whether the difference between any two scores is a statistically reliable difference. The Probable Error of Measurement for the Terman-McNemar Test of Mental Ability is approximately 2.2 standard score points for the entire age range covered by the test.

Validity. In the early days of the development of group tests of mental ability an attempt was made to validate them by correlating the scores with teachers' marks. As has been pointed out many times in the intervening years this procedure is unsatisfactory because of the serious shortcomings in teachers' judgments of mental ability. The best evidence of the validity of the Terman test is to be found in its successful use over the period of years since the test was first issued. Many instances may be cited where the Terman test has been used with great success in guidance and administration. In some situations where the use of the Terman test with entering high school students has been made a standard practice, it has been found that year after year those students who were

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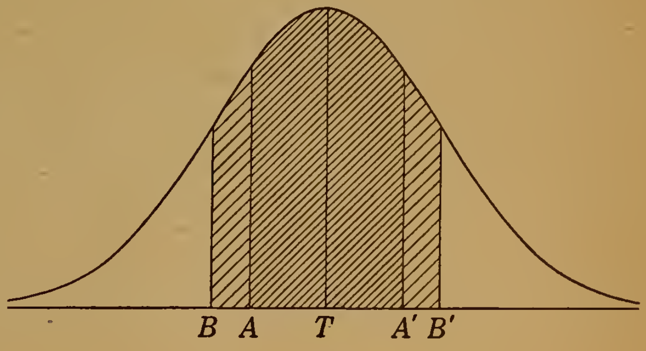
[1] The P.E.$_M$ is given by the formula P.E.$_M = .6745\,\sigma_1\sqrt{1 - r_{1I}}$, where σ_1 = the standard deviation of the obtained distribution of scores and r_{1I} is the reliability coefficient. To obtain a better idea of the meaning of this value, one must realize that an individual's "true" score is never known from a single application of any test. The "true" score is the average of an infinite number of test scores derived by repeated applications of a test to the same individual, assuming no practice effects. It is obvious that such a "true" score can never be obtained in actual practice. The Standard Error of Measurement is an estimate of the standard deviation of a distribution of such theoretical scores for a given individual. It is valuable because it gives us some idea of the fluctuation which we can expect in obtained scores due to random errors. In the following graph the curve represents a distribution of the obtained, fallible test scores around the "true" score, *T*, of an individual.



The distance *TB* or *TB′* represents the standard deviation of this theoretical distribution. This is the *Standard* Error of Measurement. The distance *TA* or *TA′* represents the *Probable* Error of Measurement, which is .6745 times the Standard Error. Fifty per cent of the scores in such a distribution would fall between plus and minus 1 PE. The most probable position in such a distribution for any obtained score is at the mean; as one moves outward toward the tails of the distribution the likelihood that the obtained score would fall at any given point decreases rapidly. Although it is not strictly accurate, it is helpful to say that the chances are 50–50 that an obtained score will fall somewhere between points *A* and *A′*, or 68 in 100 that it will fall between *B* and *B′*. Any error in such a statement is on the side of conservatism.

graduated with honors were those who made scores in the highest range of the test. The correlation of the revised test with the original test is .91, which indicates that the new test can be considered to be measuring essentially the same basic abilities covered by the original forms.

If one is willing to admit that the abilities measured by this test as a whole are important abilities for success in school and, to a certain lesser degree, in life, then it becomes reasonable to talk about the validity of the component parts of the test. Evidence regarding this has already been presented in the section on the construction of the test, where it was pointed out that 90 per cent of the items had tetrachoric correlations with the total test of .40 or over and the average tetrachoric on both forms was .53.

III. STANDARDIZATION

The standard score scale. In order to have adequate mental or educational measurement, a score scale must have (1) a single origin and (2) comparable units in all parts of the scale. It is generally recognized that raw scores do not insure comparability at all points along a scale. A difference of ten raw score points in one part of a scale may represent a different amount of ability from ten raw score points in another part of the scale. Similarly, a difference of ten raw score points at an early age may represent quite a different amount of intellectual growth from ten raw score points at a later age. For the Terman-McNemar Test of Mental Ability, a standard score scale has been devised which uses the median of the 14-year age group of the national standardization population as the origin and the standard deviation of this age group, arbitrarily made 16 points, as the unit of measurement. Scores on this scale for all age groups are thus measured from a single origin and provide comparable units throughout all parts of the scale.

After examining the distributions of raw scores for all ages, age 14 was chosen as the most unselected group for such scaling. Age 14 included 1615 cases from 13 years 6 months to 14 years 5 months inclusive; this was a 10 per cent random sample of the national population tested. Practically all the children of this age should be in the grade range tested; i.e., Grades 6 through 12. The total raw scores for this age group were distributed and the cumulative per cents getting respective raw scores were plotted on Otis Normal Percentile Charts[1] which made it possible very quickly to convert the raw scores into standard scores which would yield a normal distribution. The standard score equivalents of the raw scores were read from the chart, assuming a standard deviation of 16 for the standard scores at age 14 and arbitrarily calling the median of the 14-year-olds a standard score of 100. (The raw score standard deviation for age 14 was 26.74; the raw score median for this age was 76.00.) This gives a single standard score scale measured from the median of the 14-year-olds in units of the standard deviation of the 14-year-olds which can be used for the whole range of the test. The underlying assumption of such a scale is that the distribution of the scores in the abilities tested would be normally distributed in an unselected population if you had equal units in all parts of the scale. The stability of the standard scores so determined should be assured, since they were determined on a 10 per cent random sample out of a total population of 16,000 14-year-old students in all parts of the United States.

Establishment of norms. Norms for the Terman-McNemar Test of Mental Ability have been determined in the customary way; i.e., by finding the median standard score for successive age groups, plotting standard score against age, and drawing a smoothed norm line through the plotted points. Corrections for selection were made for ages 11, 12, 17, 18, and 19 before this norm line was drawn. About one half of the communities in the national standardization program furnished information on per cent of drop-outs during the period 1934–1941 in their schools, to aid in making such a correction. From this corrected norm line representing unselected age populations, mental ages corresponding to months of chronological age from 10 years 0 months to 19 years 11 months were determined. These mental age norms are presented in Table 2.

The norms for this test were established through a cooperative national testing program sponsored by World Book Company in which approximately 190,000 tests were distributed to 200[1] communities in 37 states and 307 parochial schools in the diocese of Philadelphia. To facilitate calculations, only a 10 per cent random sample of the test booklets was called in for setting up the norms. To insure the randomness of such a sample, communities were not notified of the serial numbers to be returned until after the tests were administered and scored. Each community tested all of the pupils in at least three consecutive grades in order to obtain at least one approximately unselected age sample from it. About one half of the communities tested more than three grades while one fourth of them tested the whole grade range. The 10 per cent random sample of test booklets was returned to World Book Company where all scoring and the calculation of chronological ages from verified birth dates were checked before the data were punched in Hollerith cards. Distributions of raw scores for separate age groups were run off; these were the basic data for setting up the standard score scale and the norms. The wide geographical distribution of the coöperating communities and the fact that all students in at least three consecutive grades were tested in each community should insure a cross section of the school population in the grades involved in the norms.

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[1] These Normal Percentile Charts proved extremely helpful in many phases of the statistical work involved in the Terman-McNemar standardization. The Chart and its uses are described in the Manual of Directions for the Otis Normal Percentile Chart and in Test Method Help, No. 4, Statistical Methods Applied to Test Scores, both published by World Book Company.

[1] Not all communities returned their tests in time to be included in the normative population. The norms are based on the results from 148 communities in 33 states where answers were recorded in the test booklets; data from the remaining communities including several communities where answers were recorded on separate answer sheets are in the process of analysis.

IV. GENERAL DIRECTIONS FOR ADMINISTERING

The test should be given in a room where a quiet atmosphere prevails both within and without. It should be administered as if it were an interesting lesson or activity, but without preliminary counsel by the teacher or examiner. Any influences which might cause tenseness and anxiety should be carefully avoided. Provision should be made to guard against interruptions of any kind. Some examiners post on the door a card reading, "Examination. Keep out!" It is best that each pupil have two sharpened pencils and an eraser and that an extra supply of pencils be on hand in case of need.

To obtain reliable results, the examiner should read the entire contents of these directions and be wholly familiar with them before attempting to give the test. The wording of the directions has been given careful study. It is intended that the directions be precise enough for all children to understand what they are to do; the person administering the test should follow these directions exactly.

Time limits are provided for the separate subtests. They should be adhered to within a margin of a few seconds. A regular watch will serve for timing; a stop watch is unnecessary. The examiner should not permit the idea of time limit to create a feeling of pressure or nervousness on the part of the pupils. What is desired is each child's best response to the test. The time limits on this test are intentionally generous, as it was the desire of the authors to make this a power test rather than a speed test. Consequently it may sometimes occur, especially in above-average groups, that an entire class will finish a subtest before the time for it has expired. In such a situation the examiner should continue with the directions for the next subtest.

V. SPECIFIC DIRECTIONS FOR ADMINISTERING

Each of you will be (or has been) given a test booklet. Don't open the test booklet until told to do so. Fill in your name and the other blanks on the front page of the booklet. (Pause for about 1½ minutes.)

If the regular edition is being used, say:

Attention! Listen carefully. I want you to understand the directions so that you can make a high score. Let us now look at the front page in order to see how the answer spaces should be marked to indicate the correct answers.

If the separate answer sheet for machine scoring is being used, substitute the following for the paragraph above:[1]

Each of you will be (or has been) given a test booklet and a separate answer sheet. ***Do not make any marks on the test booklets.*** **Fill in your name and the other blanks on the front side of the answer sheet.** (Pause for about 1½ minutes.)

Attention! Listen carefully. I want you to understand the directions so that you can make a high score. Now take your answer sheet and slip it under the edge of the test booklet so that the column of answer spaces on the right-hand side of the answer sheet marked SAMPLES is alongside the front page like this. (Show by holding up a test booklet with the answer sheet in the correct position.) **The arrows in the SAMPLES column of the answer sheet should point directly toward the arrows on the test booklet.**

After making sure that every one has properly articulated his test booklet and answer sheet, continue with the regular directions.

Look at the first example: "Steel is made from lead, iron, tin, copper, zinc." The correct answer, ***iron,*** **is number 2; so the second answer space has been blackened. Now you mark the correct answers for the remaining samples in the same way. A horse always has** (Pause) ***hoofs;*** **so blacken the space numbered 9. A quart is one fourth of a** (Pause) ***gallon;*** **so blacken the 1st space.**

In taking this test, you are first to decide which answer is correct, and then blacken with a ***soft pencil*** **the answer space which is numbered the same as your choice for the correct answer. Make your mark as long as the pair of lines, and move the pencil up and down firmly to make a heavy black line. If you change your mind, erase your first mark completely.**

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[1] It is assumed that the group has had previous experience in marking machine-scored answer sheets; if this is not the case, a practice test should be given first. Furthermore, we strongly recommend that the special pencils using the electrographic lead be used for marking the answer sheets to insure accurate machine scoring.

There is a row of answer spaces for each question. Be sure that the space you mark is in the proper row. If you omit a question, be sure to skip its row of answer spaces.

Now open the booklet to Test 1. Let us read the directions: "Mark the answer space which has the same number as the word that makes the sentence true, as shown in the sample." (Pause.) Ready — GO.

After 6 minutes, at ____ o'clock,[1] say: STOP. Turn the page to Test 2. Let us read the directions: "Mark the answer space which is numbered the same as the word which has the same or most nearly the same meaning as the beginning word of each line, as shown in the sample." (Pause.) Ready — GO.

After 6 minutes, at ____ o'clock,[1] say: STOP. Turn the page to Test 3. Let us read the directions: "Mark the answer space which has the same number as the word which tells what the thing always has or always involves, as shown in the sample." (Pause.) Ready — GO.

After 6 minutes, at ____ o'clock,[1] say: STOP. Turn over the page and turn the booklet around to Test 4.

> *If the separate answer sheet is being used, say, "Turn the answer sheet over to the column at the right marked Test 4. Be sure that the arrows on the test booklet point directly to the arrows on the answer sheet.*

Let us look at the directions: "In each line below, four of the words belong together. Pick out the one word which does not belong with the others, and mark the answer space bearing its number, as shown in the two samples." (Pause.) Ready — GO.

After 6 minutes, at ____ o'clock,[1] say: STOP. Turn to Test 5. Study the two samples carefully. (Longer pause.) Ready — GO.

After 6 minutes, at ____ o'clock,[1] say: STOP. Turn to Test 6. Let us read the directions: "Mark the answer space which has the same number as the word which is opposite, or most nearly opposite, in meaning to the beginning word of each line, as shown in the sample." (Pause.) Ready — GO.

After 6 minutes, at ____ o'clock,[1] say: STOP. Turn to Test 7. Read each statement and mark the answer space which has the same number as the answer which you think is best, as shown in the sample. (Pause.) Ready — GO.

After 4 minutes, at ____ o'clock,[1] say: STOP. Close your booklet. Collect the papers immediately.

> *If the separate answer sheet for machine scoring is being used, collect the test booklets, telling the pupils to retain the answer sheets. Then tell the pupils to go over each mark on the answer sheet, making a black shiny mark, and to erase any stray marks not intended for correct answers.*

VI. DIRECTIONS FOR SCORING

The need for accuracy in the scoring of standardized tests cannot be overemphasized. All scoring should be checked, especially if the test results are to be used for individual guidance.

Each operation in the scoring should be made as nearly mechanical as possible. The most efficient scoring is done when the process becomes very nearly automatic.

The Terman-McNemar Test is scored by means of a patented scoring arrangement which does away with the necessity of marking with pencil each item right or wrong. To score a test booklet, a perforated scoring key (which is included in each package of tests) is positioned successively over the answer spaces for each of the subtests. When the key is properly placed, only the correct answers appear through perforations in the key.

The specific steps to follow in scoring are:

1. Open the test booklet to Test 1. First scan the answer spaces rapidly to note any items which are double marked. The pupils have been instructed to put only one mark in any row of spaces, but occasionally there will be found two or more marks. Wherever two or more answer spaces for one question have been marked in spite of the precise directions, the spaces should be crossed through with a colored pencil so that an answer correct only by chance will not receive credit.
2. Superimpose the key for Test 1 on the Test 1 answer spaces so that the heavy black arrow in the center of the right-hand margin of the test page shows through the large opening in the center of the proper column of the key and the arrows on the test booklet and the key are point to point, as illustrated: **1➤⟵1**. Adjust the key with a slight rotary motion so that the answer spaces on the test paper show through the perforations of the key. This is quickly done after short practice.
3. Count the number of correct responses — i.e., the number of black marks that appear through the openings of the key. The number of correct responses is the score. Record this score in the space provided at the foot of the page, preferably with a colored pencil.
4. Each of the subtests should be scored in exactly the same way. In each case the score — i.e., number right — should be recorded in the space provided at the foot of the test page.
5. To insure accuracy, it is highly desirable to have all papers rescored, preferably by a

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[1] Unless a stop watch is used, write the finishing time for each test in the space provided; e.g., 10:06.

second person working independently. If this is not possible, it is wise to rescore those tests on which the scores fall in the lowest 25 per cent of the group.

6. Transfer the raw scores to the grid on the title page and sum them to obtain the total score.

VII. SPECIAL DIRECTIONS FOR MACHINE SCORING

It is assumed here that all persons attempting to score the Terman answer sheet on the International Test Scoring Machine will have thoroughly familiarized themselves with the scoring techniques described in the various International Business Machines publications, particularly as they concern the manipulation of the machine itself. To insure scoring of satisfactory accuracy, the following steps are suggested:

1. Be sure that the machine is properly adjusted according to the manufacturer's directions.
2. Scan each answer sheet for double-marked items and for stray pencil marks which might affect the score. Double-marked items should be completely erased, as should any stray marks, no matter how slight, which fall within the sensing spaces. If answer sheets are badly marked up, it is easier to score them by hand than to adequately scan and clean them.
3. As the answer sheets are being scored on the machine, a check scorer should rescore a certain proportion of the sheets by hand. It is suggested that the check scorer work along with the machine operator, rescoring a random selection of the papers as they come from the machine.
4. The raw scores may be entered directly on the Class Record in the columns provided for this purpose. The total raw scores (number right) may be translated into standard scores from the table given at the right-hand side of the Class Record blank; these standard scores may be recorded in the proper column of the Class Record blank.

VIII. INTERPRETATION OF SCORES

Need for means of interpretation. Raw scores on a test, that is, the number of items a pupil is able to answer correctly, have only limited meaning. They serve to arrange the individuals who have taken the test in rank order, but for all practical purposes this is the limit of their usefulness. For example, it is not possible to compare raw scores on one test with raw scores on another, even though both tests have the same number of items. As a general rule, raw scores are not even comparable from one part of the range of scores to another. For example, the difference between a score of 5 and a score of 10 is not the same as the difference between a score of 50 and a score of 55. Because of this lack of comparability, it is necessary to interpret the raw scores in some way. Traditionally, raw scores on intelligence tests have been interpreted in terms of mental ages and IQ's.

Disadvantages of traditional mental ages and IQ's. While mental ages and IQ's represent a definite step forward in comparison with total score as a means of interpreting test results, they have, especially at the upper age levels, some very serious disadvantages which are not always appreciated. Let us first consider mental ages.

A mental age is the age for which a given intelligence test score is the norm or average. Our first limitation grows out of the fact that most intelligence tests are applicable only over a very narrow range of ages. For example, the Terman-McNemar test is primarily intended to be used with pupils from 12 to 18 years inclusive. In standardizing the test, the grade range tested was extended downward one grade below the usual grades in which this test is used. Even so, mental ages can be taken literally from the data only for this limited range; values above and below these points must be determined by extrapolation, that is, by arbitrarily extending the line of relation between score and age. This may not be serious if data to supplement the test scores for lower and higher age groups are available, making it possible to estimate what the average score of these more extreme ages would be. However, really adequate information of this sort is rarely obtainable. The seriousness of this limitation is not truly appreciated until one realizes that a very small proportion of the total range of scores on a test will fall between the average score of the lowest and that of the highest age for which unselected groups are available. For example, the average score of 12-year-old children in terms of number right on the Terman-McNemar test is 59, while the average score for 16-year-old children is 93. The difference between these two values, or 34 points of score, represents only a little over one fifth of the total range of raw scores on the test. In other words, nearly four fifths of all of the scores on the test would have mental ages assigned by extrapolation.

There is another even more serious difficulty. Mental ages do not represent comparable units from one part of the scale to another. An essential condition for equality of mental age units would be that the increment in score in terms of some truly equal scale should be the same from one age to another. Whenever test scores having some claim to comparability are plotted against age, the resulting line is not straight, but tends to bend off with a characteristic negative acceleration. This norm line or growth curve reaches a maximum at some point in the upper teen ages or early twenties, but just where this maximum occurs is practically impossible to determine because of the difficulties in testing unselected groups of individuals in the upper teen age and young adult level.

Let us consider now some of the disadvantages of the traditional ratio IQ which is obtained by dividing the mental age by the chronological age. Theoretically, one of the chief virtues of the IQ is its constancy. Actually, however, for the IQ to be constant, certain conditions must be fulfilled which in actual fact rarely do obtain. In the first place, the increase in score in terms of absolute units must be equal from one age to another. We can see how absurd such an assumption is if we realize that it assumes mental power increasing at a constant rate with increasing chronological age throughout the lifetime of an individual. This of course is quite contrary to our practical experience. It is just as normal for individuals to reach a maximum of their mental powers as to reach a maximum of physical stature. Thus we are reduced to the dilemma that the IQ, defined as the ratio of MA/CA, cannot be constant unless the increment in score from one age to another is constant, and the increment in score in terms of any absolute units cannot be constant without assuming the absurd situation of mental growth continuing at a constant rate throughout the lifetime of an individual.

However, there is another equally serious limitation in the IQ. The magnitude of the IQ will vary from one test to another, as the test content differs. It seems reasonably well established now on the basis of experimental evidence that there are various aspects of mental ability. The rate of growth and the level at which the individual reaches maturity is not the same for all mental traits. This is reflected in the different relation of absolute scores to age from one test to another, which depends upon the composition of the test. Another way of stating the same thing is to say that the correlation of the scores on a test with chronological age will differ from one test to another. The magnitude of the IQ is directly affected by the amount of this correlation with a result that IQ's for two different tests cannot be assumed to be comparable unless we know that the correlation of the scores for the two tests with chronological age is the same.

Methods of interpretation recommended. Scores on the Terman-McNemar Test may be interpreted in any one of four different ways. These are:

1. Normalized standard scores
2. Mental ages
3. Deviation IQ's (ratio IQ's can be computed, but are not recommended)
4. Percentile ranks corresponding to IQ's.

One or more of these methods of interpreting raw scores will need to be used, depending upon the purpose of giving the test. After we have discussed in detail how these values are to be derived, some attention will be given to the various uses to which each one may be put.

Normalized standard scores. Standard scores are derived directly from the "number right" at the

TABLE 1

STANDARD SCORE EQUIVALENTS OF RAW SCORES ON THE TERMAN-McNEMAR TEST OF MENTAL ABILITY: FORMS C AND D

RAW SCORE	STAN. SCORE	RAW SCORE	STAN. SCORE	RAW SCORE	STAN. SCORE	RAW SCORE	STAN. SCORE
0	30	**40**	77	**80**	103	**120**	124
1	31	**41**	77	**81**	103	**121**	125
2	33	**42**	78	**82**	104	**122**	125
3	34	**43**	79	**83**	104	**123**	126
4	35	**44**	80	**84**	105	**124**	127
5	37	**45**	81	**85**	105	**125**	127
6	38	**46**	82	**86**	106	**126**	128
7	39	**47**	82	**87**	107	**127**	128
8	40	**48**	83	**88**	107	**128**	129
9	42	**49**	84	**89**	108	**129**	130
10	43	**50**	85	**90**	108	**130**	130
11	44	**51**	86	**91**	109	**131**	131
12	45	**52**	87	**92**	109	**132**	132
13	47	**53**	87	**93**	110	**133**	133
14	48	**54**	88	**94**	110	**134**	133
15	49	**55**	89	**95**	111	**135**	134
16	50	**56**	89	**96**	111	**136**	135
17	51	**57**	90	**97**	112	**137**	135
18	53	**58**	90	**98**	112	**138**	136
19	54	**59**	91	**99**	113	**139**	137
20	55	**60**	91	**100**	113	**140**	138
21	56	**61**	92	**101**	114	**141**	139
22	57	**62**	92	**102**	114	**142**	140
23	58	**63**	93	**103**	115	**143**	141
24	60	**64**	94	**104**	115	**144**	142
25	61	**65**	94	**105**	116	**145**	143
26	62	**66**	95	**106**	116	**146**	145
27	63	**67**	96	**107**	117	**147**	146
28	64	**68**	96	**108**	117	**148**	147
29	65	**69**	97	**109**	118	**149**	148
30	66	**70**	97	**110**	119	**150**	149
31	67	**71**	98	**111**	119	**151**	151
32	69	**72**	98	**112**	120	**152**	152
33	70	**73**	99	**113**	120	**153**	153
34	71	**74**	99	**114**	121	**154**	155
35	72	**75**	100	**115**	121	**155**	156
36	73	**76**	100	**116**	122	**156**	158
37	74	**77**	101	**117**	122	**157**	159
38	75	**78**	102	**118**	123	**158**	161
39	76	**79**	102	**119**	124	**159**	163

time the scores are entered on the Class Record. This is done by means of the table which appears in the right-hand margin of the Class Record. The same values also appear in Table 1 of the Manual. Number right should always be translated into standard score as there is no purpose served by raw scores which cannot be better served by standard scores.

Mental ages. Table 2 gives the age for which each of the given standard scores is the norm or average.

TABLE 2 (*Revised*)[1]

NORMS FOR TERMAN-MCNEMAR TEST OF MENTAL ABILITY

Years

Months	10	11	12	13	14	15	16	17	18	19
0	72	79	86	93	100	105	109	113	117	120
1	73	80	87	94	101	105	110	114	117	120
2	73	80	87	94	101	106	110	114	117	120
3	74	81	88	95	102	106	110	114	118	121
4	74	81	88	95	102	107	111	115	118	121
5	75	82	89	96	102	107	111	115	118	121
6	76	83	90	97	103	107	111	115	118	121
7	76	83	90	97	103	108	112	116	119	122
8	77	84	91	98	104	108	112	116	119	122
9	77	84	91	98	104	108	112	116	119	122
10	78	85	92	99	104	109	113	116	119	122
11	78	85	92	99	105	109	113	117	120	123

[1] See page 12 for more information.

These ages are mental ages in the sense in which this term is ordinarily defined. Through the major part of the age range for which the test applies, namely ages 13–16 inclusive, the age equivalents are based entirely upon data obtained in the national standardization program. Above and below these ages the norm line has been corrected to allow for known selection; the corrected values represent the best possible estimate of the true average score which would be obtained by unselected groups of individuals at the given ages. Not every standard score has an age equivalent, as this would involve extrapolating the norm line beyond limits for which adequate data are available. Age values have been given for all ages for which the test applies; higher and lower age values are not given since they would have no possible usefulness except for the computation of ratio IQ's, which are not recommended.

Deviation IQ's. Basically, the procedure for computing deviation IQ's requires that the difference be found between the obtained standard score and the average standard score for other individuals of the same age. This difference or deviation is then interpreted directly in terms of IQ from Table 3. This can be done because both IQ's and the normalized standard scores are distributed normally. For ages 13, 14, and 15, the relation between IQ and standard score is on a 1-to-1 basis. In other words, the IQ for any individual falling between 13–0 and 15–11 may be found by adding or subtracting his deviation-of-score-from-the-norm to or from 100.

TABLE 3

DEVIATION IQ'S CORRESPONDING TO GIVEN DEVIATIONS OF STANDARD SCORE FROM THE NORM

Deviation	Deviation IQ's for Ages		
	10, 11, 12	**13, 14, 15**	**16 and above**
50	161	150	144
49	160	149	144
48	159	148	143
47	158	147	142
46	157	146	141
45	155	145	140
44	154	144	139
43	153	143	138
42	152	142	137
41	150	141	136
40	149	140	136
39	148	139	135
38	147	138	134
37	145	137	133
36	144	136	132
35	143	135	131
34	142	134	130
33	141	133	129
32	139	132	128
31	138	131	128
30	137	130	127
29	136	129	126
28	134	128	125
27	133	127	124
26	132	126	123
25	131	125	122
24	129	124	121
23	128	123	120
22	127	122	120
21	126	121	119
20	125	120	118
19	123	119	117
18	122	118	116
17	121	117	115
16	120	116	114
15	118	115	113
14	117	114	112
13	116	113	112
12	115	112	111
11	113	111	110
10	112	110	109
9	111	109	108
8	110	108	107
7	109	107	106
6	107	106	105
5	106	105	104
4	105	104	104
3	104	103	103
2	102	102	102
1	101	101	101
0	**100**	**100**	**100**
− 1	99	99	99
− 2	97	98	98
− 3	96	97	97
− 4	95	96	96
− **5**	94	95	96
− 6	93	94	95
− 7	91	93	94
− 8	90	92	93
− 9	89	91	92
− **10**	88	90	91
− 11	86	89	90
− 12	85	88	89
− 13	84	87	88
− 14	83	86	87
− **15**	82	85	87
− 16	80	84	86
− 17	79	83	85
− 18	78	82	84
− 19	77	81	83
− **20**	75	80	82
− 21	74	79	81
− 22	73	78	80
− 23	72	77	79
− 24	70	76	79
− **25**	69	75	78
− 26	68	74	77
− 27	67	73	76
− 28	66	72	75
− 29	64	71	74
− **30**	63	70	73
− 31	62	69	72
− 32	61	68	71
− 33	59	67	71
− 34	58	66	70
− **35**	57	65	69
− 36	56	64	68
− 37	54	63	67
− 38	53	62	66
− 39	52	61	65
− **40**	51	60	64
− 41	50	59	63
− 42	48	58	63
− 43	47	57	62
− 44	46	56	61
− **45**	45	55	60
− 46		54	59
− 47		53	58
− 48		52	57
− 49		51	56
− **50**		50	55

TABLE 4

PERCENTILE RANK CORRESPONDING TO IQ

IQ	%-ILE
150	99.9
149	99.8
148	99.8
147	99.8
146	99.7
145	99.7
144	99.6
143	99.6
142	99.5
141	99.4
140	99.3
139	99.2
138	99
137	99
136	99
135	98
134	98
133	98
132	98
131	97
130	97
129	96
128	96
127	95
126	94
125	93
124	93
123	92
122	91
121	90
120	89
119	88
118	87
117	85
116	84
115	82
114	81
113	79
112	77
111	75
110	73
109	71
108	69
107	67
106	65
105	62
104	60
103	58
102	55
101	53
100	50
99	48
98	46
97	43
96	41
95	38
94	36
93	34
92	31
91	29
90	27
89	25
88	23
87	21
86	20
85	18
84	16
83	15
82	13
81	12
80	11
79	10
78	9
77	8
76	7
75	6
74	6
73	5
72	4
71	4
70	3
69	3
68	2
67	2
66	2
65	2
64	1
63	1
62	.9
61	.8
60	.7
59	.5
58	.5
57	.4
56	.3
55	.3
54	.2
53	.2
52	.2
51	.1

A method has been provided by means of carefully spaced tables, whereby the IQ may be obtained for any individual, regardless of age, without any arithmetical computation. The steps involved in this procedure are as follows:

1. In filling out the Class Record, arrange individuals in order of chronological age.
2. In the table on the edge of the Key, find the norm for each individual in turn, by first finding his age and then noting the score value (norm) which appears adjacent to it.
3. Place the scale so that this score or norm is opposite 100 in the proper column of IQ's for the individual's age. For example, the IQ for a child who is 10 years and 9 months old will be found from the first column headed "10, 11, 12."
4. Find the individual's obtained score in the scale appearing on the margin of the Key. Opposite this score in the table you will find the corresponding IQ which can then be entered on the Class Record.

Comparison of ratio and deviation IQ's. The advantages of the deviation method for obtaining a measure of brightness have already been pointed out, but perhaps a word would be helpful as to the relation between IQ's computed by the two methods. For approximately 700 students in the Portsmouth group taking Form C of the new test, both ratio and deviation IQ's have been computed. The results of this comparison are shown below:

$$r_{\mathrm{DIQ}\cdot\mathrm{RIQ}} = .924$$
$$\eta_{\mathrm{DIQ}\cdot\mathrm{RIQ}} = .938$$
$$\eta_{\mathrm{RIQ}\cdot\mathrm{DIQ}} = .934$$
$$\sigma_{\mathrm{DIQ}} = 17.1$$
$$\sigma_{\mathrm{RIQ}} = 29.1$$

From these data it will be seen that the rank order of deviation and ratio IQ's is very nearly identical, but that the magnitude of the IQ's will vary in increasing amount as one moves away from the mean. Because of the close correspondence between the measures of brightness obtained by the two methods, the authors feel justified in retaining the term "IQ" for the deviation measure although it is not in truth a quotient. The reason for doing this is the widespread use of the term IQ to denote a measure of brightness rather than as an abbreviation for "intelligence quotient." Because of the greater ease of computing deviation IQ's, they are more likely to be accurate than ratio IQ's.

Percentile ranks. Percentile ranks will be infrequently used, but for the benefit of those who do have occasion to use these values, they are also given in Table 4. To find the percentile rank, it is only necessary to find the IQ and opposite it will appear the corresponding percentile rank. If it is desired to find the percentile rank corresponding to a given score without recording the IQ, this can be done by following the procedure for computing IQ's, but, without first recording the IQ's, entering the table of percentile ranks corresponding to IQ's directly. The resulting percentile rank can then be thought of as the percentile rank in terms of scores for individuals of the same age.

IX. UTILIZING TERMAN-MCNEMAR TEST RESULTS

Terman-McNemar test results may be used in a wide variety of ways, only a limited number of which can be described here. Since four different methods of interpreting scores have been outlined, the best procedure may be to describe the use of the test according to the method of interpretation.

Normalized standard scores. For practically all purposes the deviation IQ's are superior to standard scores. By the use of deviation IQ's the chronological age factor is partialed out in effect, making the standard deviation constant. However, if scores are to be used, the standard scores are preferable to raw scores.

Mental ages. The uses for which mental ages can be validly employed are very limited. It occasionally is of value to know that an individual's performance is at a level corresponding to the average of children older or younger than himself. For example, in deciding to promote or retard an individual, such information may be helpful. The computation of deviation IQ's, as outlined above, does not require the use of the mental age, as such, but simply requires that the norm be found corresponding to the age of the individual. Ratio method IQ's may be computed using the table of norms as a table of mental ages, but such a procedure is not recommended.

Comparison of ratio IQ's on the old and new forms of the test. IQ's on the old and new forms of the Terman test are not directly comparable because the new norms differ from the old. This results in an increase in the standard deviation of ratio IQ's on the new test. For example, in the Portsmouth population used for equating the old and new forms, the standard deviation of ratio IQ's on the old test for that half of the group taking Form A first was 12.9 points. The standard deviation of deviation IQ's for that part of the group taking the new test, Form C, first was 16.0 points. Thus IQ's on the old and new tests are not directly comparable, and the new IQ's will tend to run higher and lower than those obtained on the old test.

For the benefit of those who have used the old test, a table of corresponding scores has been provided (Table 5) to simplify the transition from the

TABLE 5

STANDARD SCORES ON TERMAN-MCNEMAR TEST OF MENTAL ABILITY CORRESPONDING TO RAW SCORES ON THE ORIGINAL TERMAN GROUP TEST OF MENTAL ABILITY AS ESTABLISHED BY EQUATING FORMS A AND C[1]

FORM AorB RAW SCORE	FORM CorD STAN. SCORE	FORM AorB RAW SCORE	FORM CorD STAN. SCORE	FORM AorB RAW SCORE	FORM CorD STAN. SCORE	FORM AorB RAW SCORE	FORM CorD STAN. SCORE	FORM AorB RAW SCORE	FORM CorD STAN. SCORE
0	19	**40**	62	**80**	92	**120**	111	**160**	130
1	20	**41**	63	**81**	92	**121**	111	**161**	131
2	21	**42**	64	**82**	93	**122**	112	**162**	131
3	23	**43**	65	**83**	93	**123**	112	**163**	132
4	24	**44**	66	**84**	94	**124**	112	**164**	132
5	25	**45**	67	**85**	94	**125**	113	**165**	133
6	26	**46**	68	**86**	95	**126**	113	**166**	133
7	27	**47**	69	**87**	95	**127**	114	**167**	134
8	29	**48**	70	**88**	96	**128**	114	**168**	135
9	30	**49**	71	**89**	96	**129**	115	**169**	135
10	31	**50**	72	**90**	97	**130**	115	**170**	136
11	32	**51**	73	**91**	97	**131**	115	**171**	137
12	33	**52**	74	**92**	98	**132**	116	**172**	138
13	34	**53**	75	**93**	98	**133**	116	**173**	139
14	35	**54**	75	**94**	99	**134**	117	**174**	140
15	37	**55**	76	**95**	99	**135**	117	**175**	141
16	38	**56**	77	**96**	100	**136**	118	**176**	141
17	39	**57**	78	**97**	100	**137**	118	**177**	142
18	40	**58**	78	**98**	101	**138**	119	**178**	143
19	41	**59**	79	**99**	101	**139**	119	**179**	144
20	42	**60**	80	**100**	102	**140**	120	**180**	145
21	43	**61**	81	**101**	102	**141**	120	**181**	146
22	44	**62**	81	**102**	103	**142**	121	**182**	147
23	45	**63**	82	**103**	103	**143**	121	**183**	149
24	46	**64**	83	**104**	103	**144**	122	**184**	150
25	47	**65**	83	**105**	104	**145**	122	**185**	151
26	48	**66**	84	**106**	104	**146**	122	**186**	152
27	49	**67**	85	**107**	105	**147**	123	**187**	153
28	50	**68**	85	**108**	105	**148**	124	**188**	154
29	51	**69**	86	**109**	106	**149**	124	**189**	156
30	52	**70**	87	**110**	106	**150**	125	**190**	157
31	53	**71**	87	**111**	107	**151**	125	**191**	158
32	54	**72**	88	**112**	107	**152**	126	**192**	159
33	55	**73**	88	**113**	108	**153**	126	**193**	161
34	56	**74**	89	**114**	108	**154**	127	**194**	162
35	57	**75**	89	**115**	109	**155**	127	**195**	163
36	58	**76**	90	**116**	109	**156**	128	**196**	165
37	59	**77**	90	**117**	109	**157**	128	**197**	166
38	60	**78**	91	**118**	110	**158**	129	**198**	167
39	61	**79**	91	**119**	110	**159**	129		

old test to the new. By means of this table a standard score on the new test corresponding to any given raw score on the old test may be found, and from this estimated standard score and the individual's chronological age, his deviation IQ according to the new norms may be determined.

Deviation IQ's. Whenever a measure of brightness, as contrasted with a measure of mental level is needed, the deviation IQ serves this purpose. It assumes that brightness is normally distributed in any large, unselected population and that once a measure of brightness is determined for the individual it will remain constant provided the environment in which the individual moves also has a constant effect upon him. The uses to which IQ's may be put are many. If tests are given systematically over a range of grades, it is possible to determine fluctuations in the potentiality of an individual from one age to another. For example, such systematic determination of IQ's at successive ages will often provide a clue to causes of lowered average level of performance for an individual in comparison with average levels in previous years. The IQ may be used in sectioning classes, especially if promotion is on the basis of chronological age. It is of great value in guidance as it makes it possible to steer away from the professions and higher-level jobs those who do not have the mental capacity for them. Conversely it helps locate capable individuals who need encouragement and help in getting additional training.

Percentile rank. Only rarely will it be found necessary to resort to the use of percentile ranks in interpreting the Terman-McNemar results. Almost the only situation where this is desirable is where an attempt is to be made to compare achievement on a test for which percentile norms are supplied with the intelligence test results. Such a comparison is valid provided the group on which the achievement measure was standardized comprises a representative cross section of the total group at the given age or grade level. This will not be the case for most high school subject matter tests as there is a decided selection in the groups studying certain subjects. For example, percentile ranks on an algebra test should not be compared with percentile ranks on the Terman-McNemar test since there is a great deal of selection in the group taking algebra; the average IQ of this group is definitely above 100.

Subtest scores. No provision has been made for interpreting separate subtest scores, partly because the tests are too short, and partly because the tests comprising the battery are all essentially verbal in nature; having subtest scores, under the circumstances, would add little to our knowledge of the individuals tested.

Cumulative record. No better example can be found of the old saying that the whole is greater than the sum of the parts than the cumulative record on which the test scores for an individual are entered and cumulated over a period of years. Such a record can reveal more about the nature of that individual and his growth processes than any single test can possibly hope to do. It is strongly urged, therefore, that the results of the Terman-McNemar test be entered on the cumulative record card. If possible, enter both standard score and IQ, and if mental ages must be entered on the record, enter standard score and IQ as well as mental age, for convenience in later reference.

---

[1] Since the original Forms A and B were matched for item difficulty in their construction, their comparability later checked experimentally, and since the two forms have been used interchangeably with apparent success for many years, it should be safe to assume that the standard score values in this table can be used for Form B as well as Form A of the original test. The equating of Forms C and D of the new test has already been discussed in the section on *Comparability of old and new forms.*

Revised norms. Originally the Terman-McNemar Test of Mental Ability was planned to cover the same grade range as the older Terman test — namely, Grades 7–12 — and therefore no attempt was made in the national standardization program to obtain data below the end of Grade 6. However, the results obtained in the standardization program indicated that the Terman-McNemar test could be used satisfactorily in the sixth grade. In light of this development a subsidiary experiment was undertaken for the purpose of extending the norms downward and, at the same time, to establish any correction necessary if the test were used with a Separate Answer Sheet in these lower grades. The results of this latest experiment are summarized in Table 2 (*Revised*) on page 9, and in the Separate Answer Sheet norms in Table 6, below.

The norms for the regular edition of the test have not been changed above age 14–0; that is, they remain as they appeared in the original Manual. At age 13–0 there is a difference of two points: the norm for that age is now 93; originally it was 95. The difference is greater in the lower age brackets. The variation from the original norms when the Separate Answer Sheet is used is substantial, especially in the lower ages.

Table 6

Use this table when Separate Answer Sheet is used.

Norms for Terman-McNemar Test of Mental Ability

	Years									
Months	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**
0	67	75	83	91	98	104	109	113	117	120
1	68	76	84	92	98	104	110	114	117	120
2	68	77	85	92	99	105	110	114	117	120
3	69	77	85	93	100	105	110	114	118	121
4	70	78	86	93	100	106	111	115	118	121
5	70	79	87	94	101	106	111	115	118	121
6	71	79	87	94	101	107	111	115	118	121
7	72	80	88	95	102	107	112	116	119	122
8	72	81	88	96	102	107	112	116	119	122
9	73	81	89	96	103	108	112	116	119	122
10	74	82	90	97	103	108	113	116	119	122
11	75	83	90	97	103	109	113	117	120	123

Norms for Separate Answer Sheet. The norms in Tables 6 and 7 are to be used only when the Separate Answer Sheet has been used.

Table 6 corresponds to Table 2 (*Revised*) of the regular edition and gives the age for which each of the given standard scores is the norm or average. These ages are mental ages in the sense in which this term is ordinarily defined. (For additional information see the section on "Mental ages," page 9.)

Table 7 corresponds to the table found on the right edge of the hand-scoring key. Its use facilitates the finding of the IQ without arithmetical computation. *It is only for the Separate Answer Sheet.* The steps involved are as follows:

1. For convenience, arrange the pupils' papers in order of chronological age.
2. For each individual in turn, find in the "Age" column of Table 7 his chronological age and then note the standard score value (norm) which appears adjacent to it.
3. Place the table (or scale) so that this score or norm is opposite 100 in the proper column of IQ's for the individual's chronological age in Table 3, page 9. For example, the IQ for a child who is 13 years and 9 months old will be found from the second column, which is headed "13, 14, 15."
4. Locate the individual's obtained standard score in the scale, and to the right of this score you will find in Table 3, under the appropriate age, the pupil's IQ.

The deviation IQ is based on the amount of deviation (plus or minus) between the pupil's obtained standard score and the norm for his age. (For additional information on this point see pages 9–10.)

Table 7

Age for Which Given Score Is the Norm	Score
	160
	159
	158
	157
	156
	155
	154
	153
	152
	151
	150
	149
	148
	147
	146
	145
	144
	143
	142
	141
	140
	139
	138
	137
	136
	135
	134
	133
	132
	131
	130
	129
	128
	127
	126
	125
	124
19–11, **20–0**	**123**
19–7 to 19–10	**122**
19–3 to 19–6	**121**
18–11 to **19–2**	**120**
18–7 to 18–10	**119**
18–3 to 18–6	**118**
17–11 to **18–2**	**117**
17–7 to 17–10	**116**
17–4 to 17–6	**115**
17–1 to 17–3	**114**
16–10 to **17–0**	**113**
16–7 to 16–9	**112**
16–4 to 16–6	**111**
16–1 to 16–3	**110**
15–11 to **16–0**	**109**
15–9 to 15–10	**108**
15–6 to 15–8	**107**
15–4 to 15–5	**106**
15–2 to 15–3	**105**
15–0 to **15–1**	**104**
14–9 to 14–11	**103**
14–7 to 14–8	**102**
14–5 to 14–6	**101**
14–3 to 14–4	**100**
14–2	**99**
14–0 to **14–1**	**98**
13–10 to 13–11	**97**
13–8 to 13–9	**96**
13–7	**95**
13–5 to 13–6	**94**
13–3 to 13–4	**93**
13–1 to 13–2	**92**
13–0	**91**
12–10 to 12–11	**90**
12–9	**89**
12–7 to 12–8	**88**
12–5 to 12–6	**87**
12–4	**86**
12–2 to 12–3	**85**
12–1	**84**
11–11 to **12–0**	**83**
11–10	**82**
11–8 to 11–9	**81**
11–7	**80**
11–5 to 11–6	**79**
11–4	**78**
11–2 to 11–3	**77**
11–1	**76**
10–11 to **11–0**	**75**
10–10	**74**
10–9	**73**
10–7 to 10–8	**72**
10–6	**71**
10–4 to 10–5	**70**
10–3	**69**
10–1 to 10–2	**68**
10–0	**67**
	66
	65
	64
	63
	62
	61
	60
	59
	58
	57
	56
	55
	54
	53
	52
	51
	50

TERMAN–McNEMAR TEST OF MENTAL ABILITY

By Lewis M. Terman
Stanford University, California

and Quinn McNemar
Stanford University, California

D

TEST: FORM D

Name . . . .

Date of birth . . . .
Month Day Year

Age . . . . Grade . . . . Boy . . . . Girl . . . .

School . . . .

City . . . . State . . . .

Teacher . . . . Date . . . .

Test	Score
1	
2	
3	
4	
5	
6	
7	
Total	
MA	
IQ	

Study the examples below in order to see how the answer spaces should be marked to indicate the correct answers.

1. Steel is made from
1 lead 2 iron 3 tin 4 copper 5 zinc 1

1 ☐ 2 ■ 3 ☐ 4 ☐ 5 ☐

The correct answer, ***iron****, is number 2, so the second answer space has been blackened. You mark the correct answers for the remaining samples in the same way.*

➔

2. A horse always has
6 rider 7 stable 8 shoes 9 hoofs 10 saddle 2

6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

➔

3. A quart is one fourth of a
1 gallon 2 pint 3 bushel 4 barrel 5 keg 3

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

In taking this test, you are first to decide which answer is correct, and then blacken with a soft *pencil* the answer space which is numbered the same as your choice for the correct answer. Make your mark as long as the pair of lines, and move the pencil up and down firmly to make a **heavy black** line. If you change your mind, erase your first mark completely.

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Edition a

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TEST 7. BEST ANSWER

Read each statement and mark the answer space which has the same number as the answer which you think is BEST.

SAMPLE. We should not put a burning match in the wastebasket because
1 Matches cost money. 2 We might need a match later.
3 It might go out. 4 It might start a fire.......................... 1 2 3 [✓ 4]

---

1. The saying, "The proof of the pudding is in the eating," means
1 Puddings are fattening. 2 We can only tell what a thing is like by trying it.
3 Puddings are made to be eaten. 4 Puddings taste better than they look. 1 1 2 3 4

2. The moats surrounding medieval castles were most valuable as
5 Water reservoirs. 6 Fortifications against enemies.
7 Swimming pools. 8 Protection against wild animals. 2 5 6 7 8

3. The saying, "Make hay while the sun shines," means
1 We should not shirk our duties. 2 Hay is made in summer.
3 Make the most of your opportunities. 4 Hay should not be cut at night. 3 1 2 3 4

4. The saying, "Faint heart ne'er won fair lady," means
5 He who lacks courage to try accomplishes nothing. 6 Fair ladies faint easily.
7 Beautiful women like brave men. 8 A bad heart is a great handicap. 4 5 6 7 8

5. The saying, "A bad workman quarrels with his tools," means 7
1 A soft answer turneth away wrath. 2 A bad workman is usually quarrelsome.
3 Don't cry over spilt milk. 4 People often blame their failures on others. 5 1 2 3 4

6. The saying, "One swallow does not make a summer," means
5 Many birds add to the pleasures of summer. 6 Swallows return for summer.
7 A single sign is not sufficient proof. 8 You can't trust a swallow..................6 5 6 7 8

7. The saying, "As the twig is bent, so is the tree inclined," means
1 A bent tree can't be straightened. 2 Habits acquired early affect us later.
3 Twigs can be bent more easily than trees. 4 Like father, like son. 7 1 2 3 4

8. The saying, "All is not gold that glitters," means
5 Appearances are often misleading. 6 All metals glitter.
7 Don't trust a gold digger. 8 A good name is better than riches. 8 5 6 7 8

9. The saying, "Don't make a mountain out of a molehill," means
1 Moles can't make mountains. 2 Don't be discouraged over small difficulties.
3 We don't need mountains. 4 Don't attempt impossible things. 9 1 2 3 4

10. Freezing water bursts pipes because
5 The ice stops the flow of water. 6 Ice is heavier than water.
7 Cold makes the pipes weaker. 8 Water expands when it freezes. 10 5 6 7 8

11. Merchants take yearly inventory because
1 It makes room for new stock. 2 It exposes dishonest employees.
3 It increases profits. 4 It aids in determining profits and losses. 11 1 2 3 4

12. The saying, "A stitch in time saves nine," means
5 One stitch will often do as well as more. 6 Virtue is its own reward.
7 Hardship may be prevented by a little care. 8 A little illness may be costly. 12 5 6 7 8

Score ......

TEST 1. INFORMATION

Mark the answer space which has the same number as the word that makes the sentence TRUE.

SAMPLE. Our first President was
1 Adams 2 Washington 3 Lincoln 4 Jefferson 5 Monroe....
1 [✓ 2] 3 4 5

[illegible]. The piccolo is used in
1 printing 2 weaving 3 mining 4 music 5 farming..........1
1 2 3 4 5

2. Tweed is a kind of
6 drink 7 weed 8 sound 9 wood 10 cloth..................2
6 7 8 9 10

3. Nicotine is a poison found in ➡
1 tobacco 2 spiders 3 sumac 4 creosote 5 snakes..........3
1 2 3 4 5

4. A typhoon is a
6 quake 7 disease 8 wind 9 financier 10 whirlpool..........4
6 7 8 9 10

5. A peck is a fourth of a
1 pint 2 quart 3 gallon 4 bushel 5 barrel..................5
1 2 3 4 5

6. Confucius founded a religion common among the
6 Persians 7 Indians 8 Chinese 9 Japanese 10 Egyptians...6
6 7 8 9 10

7. Chess is a kind of
1 nut 2 game 3 bug 4 cheese 5 cat......................7
1 2 3 4 5

8. Sauerkraut is made from
6 cabbage 7 lettuce 8 celery 9 soybeans 10 cucumbers......8
6 7 8 9 10

9. Guernsey is a kind of
1 horse 2 chicken 3 dog 4 cow 5 rabbit..................9
1 2 3 4 5

10. The turquoise is usually
6 colorless 7 brown 8 red 9 yellow 10 blue...............10
6 7 8 9 10

1➡

11. "Treasure Island" tells about
1 Long John 2 Gulliver 3 Sindbad 4 Midas 5 Micawber...11
1 2 3 4 5

12. A gas commonly used in luminous signs is
6 oxygen 7 hydrogen 8 neon 9 photon 10 radium.........12
6 7 8 9 10

13. Perjury is a term used in
1 pedagogy 2 theology 3 medicine 4 law 5 pediatrics......13
1 2 3 4 5

14. The optic nerve is for
6 hearing 7 tasting 8 feeling 9 smelling 10 seeing........14
6 7 8 9 10

15. A cameo is a kind of
1 robe 2 animal 3 jewel 4 flower 5 insect................15
1 2 3 4 5

16. The Parthenon was a
6 temple 7 school 8 gladiator 9 treaty 10 chariot.........16
6 7 8 9 10

17. The guillotine causes
1 disease 2 death 3 fever 4 anemia 5 suffocation..........17
1 2 3 4 5

18. The United States bought Florida from the
6 French 7 English 8 Mexicans 9 Spanish 10 Indians.....18
6 7 8 9 10

19. Socrates was a
1 poet 2 playwright 3 philosopher 4 politician 5 scientist...19
1 2 3 4 5

20. An eight-sided figure is called a (an)
6 trapezium 7 octagon 8 scholium 9 octave 10 heptagon...20
6 7 8 9 10

[illegible]. The Franciscans in medieval times were
1 dancers 2 friars 3 vassals 4 misers 5 sailors..........21
1 2 3 4 5

22. The ampere is a measure of ➡
6 amplitude 7 electricity 8 weight 9 temperature 10 speed 22
6 7 8 9 10

23. "The Last of the Mohicans" was written by
1 Hawthorne 2 Defoe 3 Scott 4 Cooper 5 Irving..........23
1 2 3 4 5

24. Inability to pay one's debts is called
6 poverty 7 insolvency 8 stinginess 9 economy 10 extravagance 24
6 7 8 9 10

25. A windlass is used for
1 boring 2 cutting 3 squeezing 4 sailing 5 lifting..........25
1 2 3 4 5

Score......

TEST 6. OPPOSITES

Mark the answer space which has the same number as the word which is OPPOSITE, or most nearly opposite, in meaning to the beginning word of each line.

SAMPLE. north — 1 hot 2 east 3 west 4 down 5 south 1 2 3 4 5

1. together — 1 alternately 2 differently 3 apart 4 entirely 5 altogether . . 1 — 1 2 3 4 5
2. publicly — 6 prudently 7 singly 8 privately 9 stealthily 10 slyly . . . . . . 2 — 6 7 8 9 10
3. limited — 1 brief 2 endless 3 costly 4 unfinished 5 exempted . . . . 3 — 1 2 3 4 5
4. prohibit — 6 suffice 7 promise 8 provide 9 relegate 10 allow . . . . 4 — 6 7 8 9 10
5. hinder — 1 attack 2 attain 3 help 4 avoid 5 try . . . . 5 — 1 2 3 4 5
6. minimum — 6 maxim 7 maximum 8 large 9 surplus 10 best . . . . 6 — 6 7 8 9 10
7. brisk — 1 slow 2 warm 3 heavy 4 soft 5 slight . . . . 7 — 1 2 3 4 5
8. significant — 6 mistaken 7 simple 8 unfavorable 9 universal 10 meaningless 8 — 6 7 8 9 10
9. existent — 1 extended 2 narrow 3 vestigial 4 extinct 5 ordinary . . . . . 9 — 1 2 3 4 5
10. kindle — 6 sprinkle 7 parch 8 irrigate 9 freeze 10 quench . . . . 10 — 6 7 8 9 10

6 ➔

11. expand — 1 save 2 evaporate 3 contract 4 merge 5 inhale . . . . 11 — 1 2 3 4 5
12. legitimate — 6 enforced 7 illegible 8 distinct 9 unlawful 10 ignorant . . 12 — 6 7 8 9 10
13. opposition — 1 supposition 2 repression 3 deposition 4 contention 5 support 13 — 1 2 3 4 5
14. optional — 6 compulsory 7 complacent 8 expedient 9 arbitrary 10 desultory 14 — 6 7 8 9 10
15. remote — 1 neighborly 2 related 3 familiar 4 near 5 around . . . . . . 15 — 1 2 3 4 5
16. opportune — 6 intolerant 7 untactful 8 untimely 9 unfortunate 10 tardy 16 — 6 7 8 9 10
17. contemptible — 1 appreciative 2 peaceable 3 scrupulous 4 temptable 5 admirable 17 — 1 2 3 4 5
18. fastidious — 6 vigorous 7 slovenly 8 hungry 9 querulous 10 perverse . . 18 — 6 7 8 9 10
19. honorable — 1 disabled 2 disheveled 3 disreputable 4 disrespectful 5 disgusting 19 — 1 2 3 4 5
20. clemency — 6 finality 7 severity 8 security 9 vitality 10 ecstasy . . . . . . 20 — 6 7 8 9 10
21. rampant — 1 restrained 2 swift 3 fortified 4 rational 5 restive . . . . . . 21 — 1 2 3 4 5
22. transient — 6 intransitive 7 permeable 8 lethargic 9 permanent 10 tranquil 22 — 6 7 8 9 10
23. discernible — 1 indiscreet 2 imperceptible 3 conciliable 4 flexible 5 indivisible 23 — 1 2 3 4 5
24. incite — 6 quell 7 propound 8 wrench 9 inquire 10 dispel . . . . 24 — 6 7 8 9 10
25. awkward — 1 graceless 2 talented 3 meticulous 4 dexterous 5 clever . . 25 — 1 2 3 4 5

Score . . . . .

TEST 2. SYNONYMS

Mark the answer space which has the same number as the word which has the SAME or most nearly the same meaning as the beginning word of each line.

SAMPLE. correct — 1 neat 2 fair 3 right 4 poor 5 good .... 1 2 ●3 4 5

---

1. content — 1 cheerful 2 satisfied 3 well 4 willing 5 rested ....1 — 1 2 3 4 5

2. gloomy — 6 angry 7 rainy 8 frightful 9 empty 10 dismal ....2 — 6 7 8 9 10

3. convert — 1 bend 2 change 3 prove 4 place 5 invert ....3 — 1 2 3 4 5

4. ripe — 6 juicy 7 red 8 full 9 good 10 mature ....4 — 6 7 8 9 10

5. procure — 1 proffer 2 sustain 3 create 4 obtain 5 seek ....5 — 1 2 3 4 5

➡

6. bloat — 6 shock 7 inflate 8 blubber 9 bluster 10 ventilate ....6 — 6 7 8 9 10

7. fondle — 1 impress 2 found 3 caress 4 feed 5 confuse ....7 — 1 2 3 4 5

8. curative — 6 bitter 7 recovery 8 remedy 9 doctor 10 director ....8 — 6 7 8 9 10

9. chasm — 1 divide 2 convulsion 3 default 4 trap 5 abyss ....9 — 1 2 3 4 5

10. compulsory — 6 irresistible 7 imperative 8 advisory 9 wise 10 optional. . .10 — 6 7 8 9 10

2➡

11. entice — 1 enthrall 2 offer 3 allure 4 flirt 5 pray ....11 — 1 2 3 4 5

12. banish — 6 exile 7 condemn 8 disappear 9 revenge 10 forget ....12 — 6 7 8 9 10

13. agile — 1 able 2 fragile 3 nimble 4 aerial 5 slender ....13 — 1 2 3 4 5

14. divisible — 6 divorced 7 separable 8 separated 9 divisory 10 perceptible 14 — 6 7 8 9 10

15. sacred 1 beloved 2 forbidden 3 hallowed 4 eternal 5 precious . . . .15 — 1 2 3 4 5

16. adversary — 6 criminal 7 partner 8 instigator 9 opponent 10 adviser . . . .16 — 6 7 8 9 10

17. dilemma — 1 debate 2 obstacle 3 vexation 4 possibility 5 predicament. .17 — 1 2 3 4 5

18. arrogant — 6 wandering 7 unruly 8 ignorant 9 haughty 10 mistaken. . .18 — 6 7 8 9 10

➡

19. cache — 1 hide 2 seal 3 buy 4 steal 5 sneak ....19 — 1 2 3 4 5

20. amass — 6 worship 7 hoard 8 disperse 9 skimp 10 develop ....20 — 6 7 8 9 10

21. bias — 1 prejudice 2 judgment 3 reason 4 argument 5 opinion. . . .21 — 1 2 3 4 5

22. economy — 6 plenty 7 solvency 8 debility 9 frugality 10 poverty ......22 — 6 7 8 9 10

23. abdicate — 1 relinquish 2 reform 3 vanish 4 dethrone 5 proclaim .....23 — 1 2 3 4 5

24. caustic — 6 causative 7 tarnished 8 corrosive 9 flammable 10 flaky. .24 — 6 7 8 9 10

25. cleft — 1 quake 2 qualm 3 palate 4 crate 5 chink ....25 — 1 2 3 4 5

Score . . . . . .

TEST 5. ANALOGIES

Study the samples carefully.

SAMPLES.
Ear is to hear as eye is to
1 cry 2 glasses 3 spy 4 wink 5 see.................... 1 2 3 4 [✓ 5]
Hat is to head as shoe is to
6 arm 7 leg 8 foot 9 fit 10 glove.................... 6 7 [✓ 8] 9 10

DO THEM ALL LIKE THE SAMPLES.

---

1. Army is to general as navy is to
1 ensign 2 admiral 3 boatswain 4 pilot 5 major............1 1 2 3 4 5

2. Success is to joy as failure is to
6 work 7 happiness 8 poor 9 luck 10 sadness............2 6 7 8 9 10

3. 4 is to 36 as 6 is to
1 *(99)* 2 *(54)* 3 *(37)* 4 *(26)* 5 *(25)* 3 1 2 3 4 5

4. Tell is to told as speak is to
6 spank 7 scold 8 said 9 speaking 10 spoke..............4 6 7 8 9 10

5. String is to kitten as rattle is to ➔
1 shake 2 car 3 snake 4 baby 5 racket..................5 1 2 3 4 5

6. Poison is to death as food is to
6 bird 7 life 8 bad 9 birth 10 eat......................6 6 7 8 9 10

7. Lead is to heavy as cork is to
1 float 2 porous 3 light 4 bottle 5 stopper...............7 1 2 3 4 5

8. Peach is to tree as cucumber is to
6 bush 7 ground 8 vine 9 pickle 10 garden.............8 6 7 8 9 10

9. Past is to present as yesterday is to
1 future 2 memory 3 tomorrow 4 gone 5 today..........9 1 2 3 4 5

10. b is to d as second is to
6 third 7 fourth 8 later 9 last 10 next..................10 6 7 8 9 10

5➔

11. Bear is to hair as trout is to
1 water 2 fish 3 scales 4 swim 5 skin...................11 1 2 3 4 5

12. Cry is to laugh as mourning is to
6 rejoicing 7 coffin 8 woe 9 praying 10 death............12 6 7 8 9 10

13. Bad is to worse as worse is to
1 poor 2 good 3 worst 4 better 5 best.................13 1 2 3 4 5

14. Sextet is to six as octet is to
6 song 7 eight 8 four 9 eighteen 10 octagon.............14 6 7 8 9 10

15. 10 is to 100 as 12 is to
1 *(24)* 2 *(112)* 3 *(144)* 4 *(200)* 5 *(1200)* 15 1 2 3 4 5

16. Salmon is to fish as goose is to ➔
6 duck 7 feather 8 feast 9 fowl 10 grouse...............16 6 7 8 9 10

17. Round is to shape as large is to
1 small 2 height 3 length 4 heavy 5 size.................17 1 2 3 4 5

18. Cello is to strings as clarinet is to
6 blow 7 brass 8 band 9 reed 10 pluck.................18 6 7 8 9 10

19. Brick is to clay as glass is to
1 sand 2 mud 3 salt 4 mica 5 water...................19 1 2 3 4 5

20. Pro is to con as for is to
6 forever 7 against 8 forth 9 after 10 aft................20 6 7 8 9 10

21. Subject is to predicate as noun is to
1 verb 2 adjective 3 nominative 4 pronoun 5 adverb 21 1 2 3 4 5

22. Introduction is to conclusion as overture is to
6 music 7 prelude 8 opera 9 finale 10 intermission.......22 6 7 8 9 10

23. $\frac{9}{4}$ is to $\frac{3}{4}$ as 18 is to
1 *(6)* 2 *(8)* 3 *(9)* 4 *(12)* 5 *(36)*.........................23 1 2 3 4 5

24. Bread is to mold as tree is to
6 bark 7 leaf 8 moss 9 seed 10 root....................24 6 7 8 9 10

25. Suicide is to self as matricide is to
1 murder 2 matron 3 father 4 another 5 mother..........25 1 2 3 4 5

Score......

TEST 3. LOGICAL SELECTION

Mark the answer space which has the same number as the word which tells what the thing ALWAYS has or ALWAYS involves.

SAMPLE. A cat always has
1 kittens 2 spots 3 milk 4 mouse 5 hair . . . . 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ■

---

1. A bird always has
1 nest 2 eggs 3 bones 4 cage 5 mate . . . . 1 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

2. A pistol always has
6 smoke 7 holster 8 barrel 9 bullet 10 sights . . . . 2 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

3. A magazine always has
1 advertisements 2 print 3 stories 4 editorials 5 pictures . . . 3 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

4. A dress always has
6 sleeves 7 collar 8 buttons 9 belt 10 fabric . . . . 4 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

5. Conversation always involves
1 agreement 2 questions 3 persons 4 wit 5 formality . . . . 5 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

6. A soldier always has
6 courage 7 duty 8 bayonet 9 helmet 10 tent . . . . 6 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

7. An advertisement always has
1 purpose 2 color 3 novelty 4 accuracy 5 illustrations . . . . . . 7 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

8. A circle always has →
6 tangent 7 perpendicular 8 diagonal 9 altitude 10 radius . . . 8 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

9. A banquet always has
1 speeches 2 favors 3 flowers 4 food 5 music . . . . 9 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

10. A liquid always has
6 taste 7 transparency 8 beauty 9 odor 10 weight . . . . 10 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

3→

11. Co-operation always involves
1 enthusiasm 2 economy 3 association 4 friendship 5 contention 11 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

12. A parade always has
6 band 7 horses 8 floats 9 display 10 confetti . . . . 12 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

13. A jury verdict always involves
1 guilt 2 disgrace 3 justice 4 sentence 5 decision . . . . 13 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

14. A mistake always involves
6 error 7 punishment 8 regret 9 correction 10 carelessness 14 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

15. A storm always involves
1 snow 2 rain 3 wind 4 disturbance 5 destruction . . . . 15 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

16. A crisis always involves
6 grief 7 panic 8 uncertainty 9 pain 10 ruin . . . . 16 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

17. Controversy always involves →
1 settlement 2 hatred 3 enmity 4 lawsuit 5 disagreement . . 17 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

18. A debtor always has
6 resentment 7 obligation 8 honesty 9 property 10 assets . . 18 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

19. Obstacles always bring
1 obstinacy 2 grief 3 hindrance 4 failure 5 stimulation . . . . 19 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

20. A restaurant always has
6 waiters 7 utensils 8 checks 9 tables 10 counter . . . . 20 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

21. Temperance always involves
1 moderation 2 legislation 3 digestion 4 preaching 5 laws . . 21 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

22. Annexation always involves
6 division 7 seizure 8 dispute 9 attachment 10 defeat . . . . . 22 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

23. A revelation always involves
1 trickery 2 disclosure 3 mysticism 4 revelry 5 prophecy . . 23 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

24. Priority always involves
6 precedence 7 prominence 8 recency 9 skill 10 seniority . . 24 — 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

25. Procrastination always involves
1 laziness 2 indecision 3 indifference 4 delay 5 injustice . . . 25 — 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Score . . . . . .

Terman-McNemar: D

TEST 4. CLASSIFICATION

In each line below, four of the words belong together. Pick out the ONE WORD which does not belong with the others, and mark the answer space bearing its number.

SAMPLES.

1 dog 2 cat 3 horse 4 chicken 5 cow...................... 1 2 3 [✓ 4] 5

6 hop 7 run 8 stand 9 skip 10 walk...................... 6 7 [✓ 8] 9 10

---

1. 1 leaf 2 twig 3 bark 4 shade 5 root ....1 — 1 2 3 4 5
2. 6 baboon 7 ape 8 gorilla 9 monkey 10 gazelle ....2 — 6 7 8 9 10
3. 1 loud 2 near 3 close 4 distant 5 far ....3 — 1 2 3 4 5
4. 6 gold 7 silver 8 coal 9 copper 10 nickel ....4 — 6 7 8 9 10
5. 1 judge 2 witness 3 attorney 4 prison 5 defendant ....5 — 1 2 3 4 5
6. 6 lawyer 7 doctor 8 janitor 9 preacher 10 teacher ....6 — 6 7 8 9 10
7. 1 thermometer 2 automobile 3 barometer 4 clock 5 speedometer ....7 — 1 2 3 4 5
8. 6 cold 7 sour 8 spicy 9 rancid 10 salty ....8 — 6 7 8 9 10 ➡
9. 1 Socialist 2 Communist 3 Democrat 4 Methodist 5 Republican ....9 — 1 2 3 4 5
10. 6 cornet 7 clarinet 8 flute 9 tuba 10 violin ....10 — 6 7 8 9 10

4➡

11. 1 strong 2 short 3 narrow 4 slender 5 broad ....11 — 1 2 3 4 5
12. 6 castle 7 bungalow 8 barn 9 mansion 10 cottage ....12 — 6 7 8 9 10
13. 1 cricket 2 beetle 3 ant 4 gopher 5 wasp ....13 — 1 2 3 4 5
14. 6 Emperor 7 King 8 Sultan 9 Czar 10 Priest ....14 — 6 7 8 9 10
15. 1 cat 2 cow 3 wolf 4 pig 5 dog ....15 — 1 2 3 4 5
16. 6 hammer 7 spike 8 tack 9 bolt 10 rivet ....16 — 6 7 8 9 10
17. 1 drama 2 author 3 essay 4 novel 5 poem ....17 — 1 2 3 4 5
18. 6 unselfish 7 benevolent 8 hospitable 9 penurious 10 charitable ....18 — 6 7 8 9 10
19. 1 pencil 2 stylus 3 blackboard 4 chalk 5 crayon ....19 — 1 2 3 4 5
20. 6 merge 7 rend 8 join 9 unite 10 connect ....20 — 6 7 8 9 10
21. 1 monsoon 2 earthquake 3 squall 4 tornado 5 hurricane ....21 — 1 2 3 4 5
22. 6 poplar 7 pine 8 elm 9 maple 10 oak ....22 — 6 7 8 9 10 ➡
23. 1 carefulness 2 forethought 3 industry 4 indolence 5 thrift ....23 — 1 2 3 4 5
24. 6 then 7 here 8 today 9 anon 10 now ....24 — 6 7 8 9 10
25. 1 hemp 2 jute 3 flax 4 cotton 5 wool ....25 — 1 2 3 4 5

Score ......

IOWA EVERY-PUPIL TESTS OF BASIC SKILLS

NEW EDITION

SCORING

EXAMINER'S MANUAL

FOR

TEST B – ADVANCED

CONV. TABLES

WORK-STUDY SKILLS

Grades 5-9

INTERPRETATION

B

HOUGHTON MIFFLIN COMPANY
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GENERAL DIRECTIONS

1. Make yourself thoroughly familiar with the test and with the detailed directions for it before attempting to administer it. You should go through each step of the directions beforehand, reading aloud those parts that are to be read to the pupils, in order that the directions may be read without hesitation and with proper emphasis.

2. Physical conditions: The room in which the tests are to be administered should be quiet, and arrangements should be made so that there will be no interruptions or distractions. Preferably, only the pupils and the person (or persons) giving the test should be present.

3. Seating: Pupils should be separated as much as the seating arrangement of the room allows. A seating arrangement which makes copying difficult is better than warning against copying. When the tests are given to large groups, there should always be one proctor for every thirty pupils.

4. Preparation: Desks should be cleared of all other materials. The pupils should be told in advance to bring to class two pencils. *Soft*, blunt pencils are preferable. The examiner should also have a few on hand.

5. Keeping time: It is especially important with short testing periods that time be kept accurately. A watch with a second hand will do for this purpose; a stop watch is even better. If you are using an ordinary watch, make a *written* note of the exact time at which you start each subtest.

6. After the test has begun, walk quietly about the room, seeing that pupils:
   a. are indicating answers by the proper method;
   b. are working on the right part of the test;
   c. are not dawdling or wasting time on items that are too difficult for them;
   d. are not delayed by pencils breaking, etc.

Give no help other than showing pupils the proper procedure.

DIRECTIONS FOR ADMINISTERING

This test may be administered in a single period of approximately 90 minutes or in two periods of about 45 minutes each. The actual working time on the complete test is exactly 77 minutes. The remaining time will be used for distributing materials, reading directions, etc. It is recommended that the test be given in a single period with only a brief intermission to permit the pupils to relax.

Directions for administering the test in a single period are given below. Directions for administration in two periods are given on page 5. The detailed directions given herein should be followed exactly.

(1) To administer the test, begin by saying,

> "*Today we are going to take a test of study skills. I shall now pass out the test booklets. Place them on your desks with the title page up and wait until I give further directions.*"

(2) When the booklets have been distributed, say,

> "*Look at the first paragraph of the directions. It says:* ***The other side of this page is an*** answer sheet ***on which you will mark your answers to all of the questions in this test. To use this answer sheet, you will have to tear it off. Do this now, tearing very carefully along the perforation at the left-hand side of this page.***"

(3) When all pupils have torn off the answer sheet, say,

> "*Now turn the page over and print your name, grade, etc., in the blanks at the top of the answer sheet.*"

Part I. 28 min.

(4) When the blanks have been filled, say,

> "*Notice the numbered rows of boxes on this page. The large number to the left of each row of boxes corresponds to the number of a question. There are as many rows of boxes as there are questions in the test. Now turn your answer sheet over and read the remainder of the directions on the title page silently while I read them aloud.* [Pause.] *They say:* ***Each question in Part I of this test is followed by four possible answers, only one of which is correct or definitely better than any of the others. To answer a question, first decide which is the best answer, then find the*** row ***of boxes on the answer sheet numbered the same as the*** question, ***and then place an* X *in one of these boxes as follows:***
>
> ***If you think the*** first ***answer is best, mark the*** first ***box in the row.***
>
> ***If you think the*** second ***answer is best, mark the*** second ***box in the row.***
>
> ***If you think the*** third ***answer is best, mark the*** third ***box in the row.***
>
> ***If you think the*** fourth ***answer is best, mark the*** fourth ***box in the row.***
>
> ***"Answer the questions in the order in which they are given, but do not linger too long over difficult questions. Skip them, and return to them later if time permits. If you do skip any question, be sure to skip the corresponding row of boxes on the answer sheet also. Any mark which you unintentionally place in a wrong row will count against you. Mark only*** one ***box in each row. If you change your mind about an answer, erase your first mark very thoroughly.***
>
> ***"Some parts of this test are quite long, and you are not expected to answer all of the questions in each part in the time allowed. Do not become discouraged if you are told to stop working on a part before you have finished it. Work as rapidly as you can without becoming careless.***
>
> "*Now turn the title page over, so that the answer sheet is up, and place it to the right and close to your test booklet. Then turn the test booklet over to Part I, Section A, on page* 10. [Pause.] *You are to do page* 10 *first and then go back to page* 1 *at the beginning of the booklet. Read the directions on page* 10 *silently while I read them aloud. They say:* ***These questions are based on the map below. This is a map of an imaginary land. The cities on the map are lettered instead of named. In order to help you find them quickly, these letters have been arranged in alphabetical order, beginning with A near the top. The key to the map is found below it. You are to read each question and decide which of the four answers is correct according to the map; then mark the proper box on the answer sheet.*** [Pause.]
>
> "*Before you begin work, I want to make sure that you understand how to mark your answers on the answer sheet. Look at the sample question numbered zero, and then glance at the map.* [Pause.]

What is the correct answer to this question? [Pause for reply.] *Yes, answer number 4 is correct. Now look on the answer sheet, near the top of the left-hand column, for the row of boxes numbered zero. To mark this question you would put an* **X** *in which box?* [Pause for reply.] *Yes, the fourth box. Everyone place an* **X** *in that box now.* [Pause.]

"The rest of the questions are to be marked in the same way. Be very careful each time to find the row of boxes that has the same number as the question you are answering, and then be sure to place your mark in the box which corresponds to the correct answer. Make your marks very plain and heavy.

"You will have 28 minutes for Part I. This part stops at the bottom of page 3. Remember to turn back to page 1 after finishing page 10. Now we are ready to begin. If any of you have any questions, raise your hand, and I will help you after the others have begun. Ready, go."

Note the exact time and write it down. Then walk among the pupils to make sure that all are using the answer sheet properly and to answer any questions about the procedure. Try to check the work of all pupils in this respect during the first 8 minutes. Give any necessary suggestions to pupils who do not seem to understand the directions, but, of course, do not help them answer any of the questions.

(5) At the end of exactly 8 minutes, say,

"If you have not finished the questions on page 10, leave them now and turn immediately to page 1 on the other side of the booklet. Read the directions at the top of the first column and go ahead."

(6) At the end of 7 more minutes (exactly 15 minutes from the start of Part I), say,

"If you have not finished the questions on page 1, leave them now and go on immediately to page 3. Read the directions at the top of the first column. Do not turn to page 4 until I tell you to do so. Go ahead."

(If test is to be given in two periods, continue from this point with the alternate directions on page 5.)

Part II. 5 min.

(7) At the end of 13 more minutes (exactly 28 minutes from the start of Part I), say,

"Stop. Everybody stop. Time is up on Part I. Now turn to Part II on page 4 and fold back the booklet so that only page 4 is up. [Show the pupils how to fold back the booklet. Make sure that each pupil has only page 4 showing.] *Part II is a test of your ability to use references. Read the directions at the top of page 4 silently while I read them aloud. They say:* ***For each question, decide which answer is best and then mark an X in the proper box on the answer sheet. Mark only one box for each question.*** *For example, to answer the sample exercise,* ***How long do moths live?****, we would use an encyclopedia. Therefore, an* **X** *has been placed in the second box of row number zero on the answer sheet.* [Pause.] *Are there any questions?* [Pause.] *You will have just 5 minutes for this page. Ready, go."*

(8) At the end of exactly 5 minutes, say,

"Stop. Everybody stop. Time is up on Part II. Now close your test booklet and lay your answer sheet on top with the title page up. [Pause to see that this is done.] *We will rest a few minutes before finishing the test."*

The length of this rest period, and how it should be used, will be left to the discretion of the examiner. (Two or three minutes, during which the pupils are permitted to stand up, should be sufficient.)

Part III. 10 min.

(9) At the end of the rest period, say,

"Now let's go back to work. [Pause until all pupils are ready to proceed.] *Now turn to page 5 and fold back the booklet so that only page 5 is up. Page 5 contains* PART III, USE OF INDEX. [Pause to make sure that each pupil has only page 5 showing.] *Read silently the directions at the top of page 5 while I read them aloud. They say:* ***The questions at the right below are based upon the index at the left.*** **The answer to each question is a number or an X.** ***You are to decide, from studying the index, what number is the proper answer to each question. Then write that number on the answer sheet in the blank that is numbered the same as the question. If the index does not contain the answer, place an X in the blank.***

"For example, the first sample question asks for the page on which you would find information about the commercial airplane. In the index, we find that the commercial airplane is discussed on page 849; so 849 is written in the blank numbered zero on the answer sheet. The index does not include a definition of crime; so an X is placed in the blank for the second sample.

"You are not at any time to turn back to the parts of the test that you have already taken. Have you any questions about what you are to do? [Pause.] *You will have just 10 minutes for this page. Ready, go."*

Part IV. 17 min.

(10) At the end of exactly 10 minutes, say,

"*Stop. Everybody stop. Now turn to page* 7, PART IV, USE OF DICTIONARY. *Do not fold your booklet.* [Pause.] *Read the directions silently as I read them aloud. They say:* ***Use the sample dictionary on the opposite page to answer the following questions. For each question, place an* X *in the proper box on the answer sheet. Mark only* one *answer to each question.***

"*Skim through the aids to using the sample dictionary at the bottom of page* 6 *before beginning work. You will have to use these aids in answering some of the questions. Do you have any questions about how you are to proceed?* [Answer any reasonable questions.] *You will have* 17 *minutes for Part IV. Ready, go.*"

Part V. 17 min.

(11) At the end of exactly 17 minutes, say,

"*Stop. Everybody stop. Now turn to Part V on pages* 8 *and* 9. [Pause.] *Part V is a test of your ability to read graphs, charts, and tables. Notice that there are a number of charts on these two pages, with several questions based upon each chart. When you finish page* 8, *go right on to page* 9. *When you have finished page* 9, *close your booklet and wait quietly. You will have* 17 *minutes for Part V. Read the directions in the first column and then go ahead.*"

(12) At the end of exactly 9 minutes, say,

"*If you have not finished the questions on page* 8, *leave them now and go on immediately to page* 9."

(13) At the end of 8 more minutes (exactly 17 minutes from the start of Part V), say,

"*Stop. Everybody stop. Close your booklet, put your answer sheet beside it, and wait until they have been collected.*"

Collect the answer sheets and test booklets in separate piles. Make sure that all materials are collected.

DIRECTIONS FOR GIVING ADVANCED TEST B IN TWO PERIODS

If the test is being given in two periods, follow the preceding directions through step 6, and then continue with steps 7 to 13 given below.

Part III. 10 min.

(7) At the end of 13 more minutes (exactly 28 minutes from the start of Part I), say,

"*Stop. Everybody stop. Time is up on Part I. Now turn to Part III on page* 5. *We will take Part II later. Fold back the booklet so that only page* 5 *is up.* [Show the pupils how to fold back the booklet. Make sure that each pupil has only page 5 showing.] *Read the directions at the top of the page silently while I read them aloud. They say:* ***The questions at the right below are based upon the index at the left.*** **The answer to each question is a number or an X.** ***You are to decide, from studying the index, what number is the proper answer to each question. Then write that number on the answer sheet in the blank that is numbered the same as the question. If the index does not contain the answer, place an* X *in the blank.***

"***For example, the first sample question asks for the page on which you would find information about the commercial airplane. In the index, we find that the commercial airplane is discussed on page* 849; *so* 849 *is written in the blank numbered zero on the answer sheet. The index does not include a definition of crime; so an* X *is placed in the blank for the second sample.***

"*Do you have any questions about how you are to proceed?* [Pause.] *Be sure to place your marks in the column for Part III on the answer sheet. You will have* 10 *minutes for Part III. Ready, go.*"

(8) At the end of exactly 10 minutes, say,

"*Stop. Everybody stop. Now close your test booklet and place your answer sheet on top with the answer side up. We will finish this test* ________ [say when]. *At that time I want each of you to be sure to take the same seat that you now have. Now wait quietly until the papers have been collected.*"

Collect the answer sheets systematically, so that they may be distributed in the same order to the proper pupils at the next period. Make sure that all booklets and answer sheets are accounted for.

Part II. 5 min.

(9) At the beginning of the next period, make sure that each pupil receives his own answer sheet and a booklet. When all pupils are ready to proceed, say,

"*Now we are going to finish the test of study skills which we began* ________. *During this period you* *are not at any time to look at the questions which you answered during the first period. Open your booklet now to Part II on page* 4, *and fold back the booklet so that only page* 4 *is up.* [Pause.] *Part II is a test of your ability to use references. Read the directions at the top of page* 4 *silently while I read them aloud. They say:* ***For each question, decide which answer is best and then mark an X in the proper box on the answer sheet. Mark only*** **one** ***box for each question.*** *For example, to answer the sample exercise,* ***How long do moths live?****, we would use an encyclopedia. Therefore, an* **X** *has been placed in the second box of row number zero on the answer sheet.* [Pause.] *Are there any questions?* [Pause.] *You will have just* 5 *minutes for this page. Ready, go.*"

Part IV. 17 min.

(10) At the end of exactly 5 minutes, say,

"*Stop. Everybody stop. Time is up on Part II. Now turn to page* 7, Part IV, Use of Dictionary. *Do not fold your booklet.* [Pause.] *Read the directions silently as I read them aloud. They say:* ***Use the sample dictionary on the opposite page to answer the following questions. For each question, place an X in the proper box on the answer sheet. Mark only*** **one** ***answer to each question.***

"*Skim through the aids to using the sample dictionary at the bottom of page* 6 *before beginning work. You will have to use these aids in answering some of the questions. Do you have any questions about how you are to proceed?* [Answer any reasonable questions.] *You will have* 17 *minutes for Part IV. Ready, go.*"

Part V. 17 min.

(11) At the end of exactly 17 minutes, say,

"*Stop. Everybody stop. Now turn to Part V on pages* 8 *and* 9. [Pause.] *Part V is a test of your ability to read graphs, charts, and tables. Notice that there are a number of charts on these two pages, with several questions based upon each chart. When you finish page* 8, *go right on to page* 9. *When you have finished page* 9, *close your booklet and wait quietly. You will have* 17 *minutes for Part V. Read the directions in the first column and then go ahead.*"

(12) At the end of exactly 9 minutes, say,

"*If you have not finished the questions on page* 8, *leave them now and go on immediately to page* 9."

(13) At the end of 8 more minutes (exactly 17 minutes from the start of Part V), say,

"*Stop. Everybody stop. Close your booklet, put your answer sheet beside it, and wait until they have been collected.*"

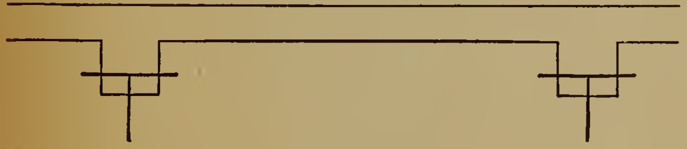
Collect the answer sheets and test booklets in separate piles. Make sure that all materials are collected.

DIRECTIONS FOR SCORING

These directions have been developed through very extensive experience in the use of the keys provided for scoring the tests and through a careful motion study of the detailed operations involved. The directions should be followed in complete detail if the key is to be employed with maximum effectiveness.

1. Work at a large table or desk surface. Place all of the Test B answer sheets to be scored in a pile directly in front of you.

2. Take the key labeled "Test B – Advanced – Form —."* (This key may be kept in your left hand throughout the time it is in use.) Adjust the key to the top answer sheet (without removing it from the pile) so that the left-hand "T" on the answer sheet fits exactly the lines running through the left-hand notch on the key, and so that the right-hand "T" fits similarly into the right-hand notch on the key. When a notch is properly adjusted over a "T," the two together should appear as in the sketch below, that is, the lines on the key should become extensions of the arms and stem of the "T."



3. Beginning with the hole labeled "I" at the lower left-hand corner of the key, count the crosses appearing through the holes joined by the solid black line. Follow the line carefully to avoid missing any holes. The number of crosses counted is the pupil's score on Part I. Enter this raw score in the appropriate blank at the top of the answer sheet. (See note 2 on page 8.)

4. Now, starting with the hole labeled "II," count the crosses appearing through the holes joined by the double (open) line. The number of crosses counted is the pupil's score on Part II. Enter this score in the appropriate blank at the top of the answer sheet.

5. If the key is properly adjusted, the pupil's responses to the items in Part III will appear through the hole in the center of the key, opposite the corresponding correct responses. Place a check mark on the answer sheet over each correct response made by the pupil. Then count the check marks that you have made to get the raw score on Part III. Enter this raw score in the appropriate blank at the top of the answer sheet.

6. Starting with the hole labeled "IV," count the crosses appearing through the holes joined by the solid black line. The number obtained is the pupil's score on Part IV. Enter this raw score in the appropriate blank at the top of the answer sheet.

7. Starting with the hole labeled "V," count the crosses appearing through the holes joined by the double (open) line. The number obtained is the pupil's score on Part V. Enter this raw score in the proper blank at the top of the answer sheet.

8. Lift the key and lay the answer sheet aside to your right, *turning it over* as you do so.

9. Score the remaining answer sheets in the same fashion, laying each paper *face down* on the pile at your right.

10. Turn the pile over and place it again before you. Add the raw scores for the various parts of the test on the top answer sheet to obtain the total raw score. Check this sum very carefully. Then lay the answer sheet aside to your right *face down.*

11. Find the total score on each of the remaining answer sheets in the same way, laying each aside *face down* on the pile at your right.

12. Turn to page 9 or 10 of this booklet (see page reference in score box at top of answer sheet) containing the conversion table for the form (L, M, N, or O) of the test you have administered.

13. In the box at the top of the answer sheet find the pupil's raw score for Part I. In the left-hand column of the proper conversion table locate this raw

---

* You will use the scoring key Form L, M, N, or O, depending on which form of the test you are scoring.

score. In the column labeled "Grade-Equivalents, Part I" find the grade-equivalent opposite this score. Record this equivalent in the proper space in the box at the top of the answer sheet. Following the same procedure, find and record the grade-equivalent for the other parts of the test and for the total score. Then lay the answer sheet face down to your right. In the same way convert the raw scores into grade-equivalents for the rest of the pupils' answer sheets.

Note 1: If two scorers are available, let one perform steps 1–9 inclusive, and let the other determine the total scores (steps 10 and 11). The greatest danger of serious error lies in the addition of the part scores, and this step should be repeated independently by a second person.

Note 2: If you are interested in getting a quick general analysis of the type of errors your pupils are making, the following procedure will be useful. As you score each paper, place a mark on the scoring key alongside each hole in the key through which no cross appears. The distribution of these marks on the keys will show you at once the items which your pupils most frequently answered incorrectly.

CONVERSION TABLES

FORM L

Part Scores						Total Scores			
Raw Score	Grade-Equivalents					Raw Score	Raw Score Grade Equiv.	Raw Score Grade Equiv.	Raw Score Grade Equiv.
	Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V				
37	125	----	----	----	----	37	128–119	85–99	42–56
36	124	----	----	----	----	36	127–119	84–97	41–55
35	123	----	----	----	----	35	126–119	83–96	40–54
34	122	----	----	----	----	34	125–119	82–95	39–53
33	121	----	----	----	----	33	124–118	81–94	38–52
32	120	----	----	----	----	32	123–118	80–93	37–52
31	119	----	----	----	----	31	122–118	79–92	36–51
30	118	----	----	----	----	30	121–117	78–92	35–50
29	117	----	----	----	----	29	120–117	77–91	34–49
28	117	----	----	----	----	28	119–117	76–90	33–48
27	116	----	----	----	----	27	118–116	75–90	32–48
26	115	----	----	----	----	26	117–116	74–89	31–47
25	114	----	----	121	----	25	116–116	73–88	30–47
24	113	----	----	119	----	24	115–116	72–87	29–46
23	112	----	----	116	119	23	114–115	71–86	28–45
22	112	----	112	112	115	22	113–115	70–85	27–44
21	108	125	109	111	111	21	112–115	69–84	26–44
20	101	122	105	109	108	20	111–114	68–83	25–43
19	97	119	102	104	103	19	110–114	67–82	24–42
18	93	115	98	99	97	18	109–113	66–81	23–42
17	90	111	96	94	94	17	108–113	65–80	22–41
16	86	108	93	88	90	16	107–113	64–79	21–41
15	80	103	91	84	87	15	106–113	63–78	20–40
14	74	98	88	81	83	14	105–112	62–77	19–39
13	68	93	84	77	79	13	104–112	61–76	18–38
12	63	89	79	71	76	12	103–112	60–75	17–38
11	58	84	76	66	72	11	102–111	59–75	16–37
10	54	77	71	63	68	10	101–111	58–74	15–36
9	50	69	66	59	64	9	100–111	57–73	14–35
8	47	62	59	56	60	8	99–110	56–72	13–34
7	43	55	55	50	55	7	98–109	55–71	12–33
6	40	51	51	44	48	6	97–109	54–70	11–33
5	37	47	44	41	46	5	96–108	53–68	10–32
4	34	42	41	37	42	4	95–107	52–67	9–31
3	33	35	38	35	38	3	94–106	51–66	8–30
2	27	28	34	32	35	2	93–106	50–65	7–29
1	20	21	30	30	31	1	92–105	49–64	6–28
0	18	19	25	27	27	0	91–104	48–62	5–27
							90–103	47–61	4–27
							89–102	46–60	3–26
							88–102	45–59	2–25
							87–101	44–58	1–24
							86–100	43–57	0–23

FORM M

Part Scores						Total Scores			
Raw Score	Grade-Equivalents					Raw Score	Raw Score Grade Equiv.	Raw Score Grade Equiv.	Raw Score Grade Equiv.
	Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V				
40	123	----	----	----	----	40	134–116	89–95	44–58
39	121	----	----	----	----	39	133–116	88–94	43–57
38	119	----	----	----	----	38	132–116	87–93	42–57
37	118	----	----	----	----	37	131–116	86–93	41–56
36	117	----	----	----	----	36	130–116	85–92	40–55
35	115	----	----	----	----	35	129–115	84–91	39–54
34	114	----	----	----	----	34	128–115	83–91	38–53
33	114	----	----	----	----	33	127–115	82–90	37–53
32	112	----	----	----	----	32	126–115	81–89	36–52
31	112	----	----	----	----	31	125–114	80–88	35–51
30	111	----	----	----	----	30	124–114	79–87	34–50
29	109	----	----	----	----	29	123–114	78–87	33–49
28	106	----	----	----	----	28	122–113	77–86	32–48
27	103	----	----	----	118	27	121–113	76–85	31–47
26	99	----	----	----	116	26	120–113	75–84	30–46
25	94	----	----	118	115	25	119–113	74–83	29–45
24	90	----	----	116	113	24	118–113	73–82	28–43
23	87	----	----	113	110	23	117–112	72–81	27–42
22	84	----	116	111	105	22	116–112	71–81	26–41
21	80	----	113	106	102	21	115–112	70–80	25–40
20	75	124	111	100	98	20	114–111	69–79	24–40
19	73	120	108	96	94	19	113–111	68–78	23–39
18	70	116	105	91	90	18	112–111	67–77	22–39
17	67	113	102	87	86	17	111–111	66–76	21–38
16	64	110	100	83	83	16	110–110	65–76	20–38
15	61	107	98	78	81	15	109–110	64–75	19–37
14	58	104	94	74	77	14	108–109	63–74	18–36
13	56	100	91	68	74	13	107–108	62–73	17–36
12	54	95	85	63	70	12	106–108	61–72	16–36
11	51	90	82	60	67	11	105–107	60–71	15–36
10	49	85	79	57	64	10	104–106	59–71	14–35
9	46	80	75	53	60	9	103–106	58–70	13–34
8	43	75	70	50	55	8	102–105	57–69	12–34
7	40	65	65	44	49	7	101–104	56–68	11–33
6	38	58	60	42	43	6	100–103	55–67	10–33
5	36	51	56	40	42	5	99–102	54–66	9–33
4	33	44	53	37	40	4	98–102	53–66	8–32
3	31	41	50	35	37	3	97–101	52–65	7–32
2	29	35	46	32	34	2	96–101	51–64	6–31
1	27	28	40	28	31	1	95–100	50–63	5–31
0	25	18	29	25	27	0	94–99	49–62	4–30
							93–98	48–61	3–30
							92–97	47–60	2–29
							91–97	46–60	1–29
							90–96	45–59	0–29

CONVERSION TABLES *(Continued)*

FORM N

Part Scores / Total Scores

Raw Score	Grade Equivalents					Raw Score	Raw Score Grade Equiv.	Raw Score Grade Equiv.	Raw Score Grade Equiv.
	Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V				
42	123	----	----	----	----	42	136–116	90–100	44–56
41	121	----	----	----	----	41	135–116	89–98	43–55
40	119	----	----	----	----	40	134–116	88–97	42–54
39	118	----	----	----	----	39	133–116	87–95	41–53
38	117	----	----	----	----	38	132–116	86–94	40–52
37	116	----	----	----	----	37	131–116	85–93	39–51
36	116	----	----	----	----	36	130–115	84–92	38–50
35	115	----	----	----	----	35	129–115	83–91	37–49
34	114	----	----	----	----	34	128–115	82–90	36–48
33	113	----	----	----	----	33	127–115	81–89	35–48
32	112	----	----	----	----	32	126–114	80–88	34–47
31	111	----	----	----	----	31	125–114	79–87	33–47
30	109	----	----	----	----	30	124–114	78–86	32–46
29	105	----	----	----	----	29	123–114	77–84	31–46
28	103	----	----	----	----	28	122–113	76–83	30–45
27	102	----	----	----	121	27	121–113	75–82	29–45
26	101	----	----	----	119	26	120–113	74–81	28–44
25	100	----	----	116	117	25	119–112	73–80	27–44
24	98	----	----	113	116	24	118–112	72–78	26–43
23	92	----	----	111	114	23	117–112	71–77	25–42
22	87	----	112	106	111	22	116–111	70–77	24–41
21	82	----	104	104	107	21	115–111	69–76	23–40
20	76	118	102	102	105	20	114–111	68–75	22–40
19	72	114	100	100	102	19	113–110	67–74	21–39
18	69	112	98	93	101	18	112–110	66–73	20–39
17	66	108	97	86	100	17	111–109	65–72	19–38
16	63	105	93	80	98	16	110–109	64–70	18–37
15	60	101	88	75	91	15	109–108	63–69	17–37
14	58	97	84	70	83	14	108–107	62–68	16–36
13	56	92	81	65	78	13	107–107	61–67	15–35
12	54	85	77	60	72	12	106–106	60–66	14–35
11	52	79	73	57	68	11	105–105	59–65	13–34
10	49	72	69	54	62	10	104–104	58–65	12–33
9	47	65	65	51	56	9	103–104	57–64	11–33
8	43	60	61	48	52	8	102–103	56–63	10–32
7	40	57	58	43	49	7	101–103	55–63	9–31
6	38	53	55	40	45	6	100–103	54–62	8–30
5	36	47	52	37	43	5	99–102	53–62	7–30
4	34	42	50	35	40	4	98–102	52–61	6–29
3	32	32	48	32	36	3	97–102	51–61	5–28
2	30	21	45	30	33	2	96–102	50–60	4–27
1	28	12	35	28	30	1	95–102	49–60	3–27
0	26	10	19	26	26	0	94–101	48–59	2–26
							93–101	47–59	1–25
							92–101	46–58	0–24
							91–100	45–57	

FORM O

Part Scores / Total Scores

Raw Score	Grade Equivalents					Raw Score	Raw Score Grade Equiv.	Raw Score Grade Equiv.	Raw Score Grade Equiv.
	Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V				
41	121	----	----	----	----	41	135–123	89–95	44–55
40	121	----	----	----	----	40	134–123	88–94	43–55
39	120	----	----	----	----	39	133–122	87–93	42–54
38	120	----	----	----	----	38	132–122	86–92	41–54
37	119	----	----	----	----	37	131–121	85–90	40–53
36	119	----	----	----	----	36	130–121	84–88	39–52
35	118	----	----	----	----	35	129–120	83–87	38–51
34	118	----	----	----	----	34	128–120	82–86	37–50
33	117	----	----	----	----	33	127–119	81–85	36–49
32	116	----	----	----	----	32	126–118	80–84	35–49
31	115	----	----	----	----	31	125–118	79–83	34–48
30	114	----	----	----	----	30	124–117	78–82	33–47
29	113	----	----	----	----	29	123–117	77–81	32–46
28	112	----	----	----	----	28	122–116	76–80	31–45
27	111	----	----	119	----	27	121–116	75–79	30–44
26	110	----	----	114	----	26	120–115	74–78	29–43
25	108	----	----	108	119	25	119–115	73–76	28–42
24	106	----	----	101	117	24	118–114	72–75	27–41
23	103	----	----	96	116	23	117–114	71–74	26–40
22	100	----	114	89	112	22	116–113	70–73	25–40
21	95	----	106	84	107	21	115–113	69–72	24–39
20	90	123	101	79	103	20	114–112	68–71	23–38
19	85	119	98	74	100	19	113–112	67–70	22–37
18	80	115	97	70	98	18	112–112	66–69	21–36
17	75	112	95	67	93	17	111–111	65–69	20–35
16	72	110	88	63	88	16	110–111	64–68	19–34
15	68	107	84	60	83	15	109–110	63–68	18–33
14	65	105	80	57	79	14	108–110	62–67	17–32
13	63	103	76	54	75	13	107–110	61–67	16–31
12	59	100	71	52	72	12	106–109	60–66	15–30
11	55	89	66	51	68	11	105–108	59–65	14–29
10	53	81	64	49	65	10	104–107	58–64	13–28
9	50	71	61	46	60	9	103–106	57–64	12–27
8	47	65	59	44	57	8	102–104	56–63	11–26
7	44	60	56	41	53	7	101–103	55–63	10–25
6	42	55	53	38	48	6	100–102	54–62	9–24
5	38	50	49	35	44	5	99–102	53–61	8–23
4	34	43	46	32	42	4	98–101	52–60	7–22
3	30	32	43	30	37	3	97–101	51–59	6–21
2	26	22	32	26	34	2	96–101	50–58	5–20
1	22	13	21	23	30	1	95–101	49–58	4–20
0	18	10	10	20	25	0	94–100	48–57	3–19
							93–100	47–57	2–18
							92–99	46–56	1–17
							91–98	45–56	0–16
							90–97		

GRADE–EQUIVALENTS

The "grade-equivalent" of a raw score on a test represents the grade level at which the *typical* pupil would make that raw score. The first digit in the [illegible]de-equivalent (unless it exceeds 99) represents the grade, and the second digit represents the month within the grade. For example, the raw score made by the typical or median pupil in the eighth grade at the end of the third month would have a grade-equivalent of 83. If, according to the conversion table on page 9 or 10, a pupil's raw score has a grade-equivalent of, say, 57, this means that he has equalled the performance of a typical fifth grade pupil in the seventh month of that grade.

Outside the range 30–99 the grade-equivalent scores should be regarded simply as comparable derived scores or as equated scores, rather than as true grade-equivalents. This is because the grade-equivalent scales beyond this range were secured by a process of linear extrapolation rather than by actually testing samples of pupils in grades above grade 9 or below grade 3.

CHRONOLOGICAL AGE–EQUIVALENTS

The age norms or chronological age-equivalents will be found in Table I on this page. The chronological age scale was fitted to the grade-equivalent scale by setting the median age of pupils just completing each grade (for grades 3–8) opposite the grade-equivalent for the ninth month in that grade, and then interpolating and extrapolating the intermediate and outlying values.

Table I presents the age-equivalent of each possible grade-equivalent. This table applies to all tests and to all forms. It is provided for those schools wishing to use age norms. To use this table, follow the procedure listed below:

a. Note the pupil's grade-equivalent for the first part of the test on the answer sheet of the test booklet.

b. Now refer to the column labeled "Grade-Equivalent" in Table I and find this grade-equiva[illegible] score. The corresponding age-equivalent is entered opposite this score in the adjacent column. For example, the age-equivalent corresponding to a grade-equivalent of 47 is 9–10, or 9 years and 10 months.

c. Record this age-equivalent in the blank space to the right of the grade-equivalent on the answer sheet of the pupil's booklet.

Table I: Chronological Age-Equivalents of Grade-Equivalents

Grade-Equivalent	Age-Equivalent	Grade-Equivalent	Age-Equivalent
109	16– 0	64	11– 6
108	15–11	63	11– 5
107	15–10	62	11– 4
106	15– 8	61	11– 2
105	15– 7	60	11– 1
104	15– 6	59	11– 0
103	15– 5	58	10–11
102	15– 4	57	10–10
101	15– 2	56	10– 8
100	15– 1	55	10– 7
99	15– 0	54	10– 6
98	14–11	53	10– 5
97	14–10	52	10– 4
96	14– 8	51	10– 2
95	14– 7	50	10– 1
94	14– 6	49	10– 0
93	14– 5	48	9–11
92	14– 4	47	9–10
91	14– 2	46	9– 8
90	14– 1	45	9– 7
89	14– 0	44	9– 6
88	13–11	43	9– 5
87	13–10	42	9– 4
86	13– 8	41	9– 2
85	13– 7	40	9– 1
84	13– 6	39	9– 0
83	13– 5	38	8–11
82	13– 4	37	8–10
81	13– 2	36	8– 8
80	13– 1	35	8– 7
79	13– 0	34	8– 6
78	12–11	33	8– 5
77	12–10	32	8– 4
76	12– 8	31	8– 2
75	12– 7	30	8– 1
74	12– 6	29	8– 0
73	12– 5	28	7–11
72	12– 4	27	7–10
71	12– 2	26	7– 8
70	12– 1	25	7– 7
69	12– 0	24	7– 6
68	11–11	23	7– 5
67	11–10	22	7– 4
66	11– 8	21	7– 2
65	11– 7	20	7– 1

PERCENTILE GRADE NORMS

The pupil percentile grade norms are presented in Tables II to VI. These percentile norms are presented in terms of grade-equivalents, and are equally applicable to all forms of the test. For any given grade-equivalent (in the left- and right-hand columns), the corresponding percentile ranks for the various tests are given in the same row in the body of the table. For example, in grade five a grade-equivalent of 43 fell at the 8th percentile in the distribution of grade-equivalents for Part I of Test B, that is, 8% of the third grade pupils made grade-equivalents below 43 on this particular subtest. These tables are provided for those schools wishing to use percentile norms.

The procedure for using these norms is as follows:

a. Note the pupil's grade-equivalent for Part I on the answer sheet of the test booklet.

b. Refer to the percentile table for the grade to which this pupil belongs.

c. In the column labeled "Grade-Equivalent" find this pupil's grade-equivalent for Part I.

d. Opposite this grade-equivalent find in Column I the pupil's percentile rank.

e. Record this percentile rank on the answer sheet of the pupil's test booklet in the space provided to the right of the grade-equivalent.

f. Proceed in the same manner for the other partial scores and the total score for the test.

Table II. Percentile Grade Norms. Grade Five

Grade Equivalent	Percentile Rank						Grade Equivalent	Grade Equivalent	Percentile Rank						Grade Equivalent	Grade Equivalent	Percentile Rank						Grade Equivalent
	Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total			Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total			Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total	
114	----	----	99*	----	----	----	114	85	94	85	85	92	94	96	85	56	42	42	40	43	42	38	56
113	----	----	98	----	----	----	113	84	93	84	84	91	93	96	84	55	38	40	37	40	40	33	55
112	----	----	98	----	----	----	112	83	92	83	83	90	92	95	83	54	33	37	35	36	38	30	54
111	----	----	97	----	----	----	111	82	91	82	83	89	91	94	82	53	30	33	32	33	36	27	53
110	----	----	97	----	----	----	110	81	90	81	82	88	90	92	81	52	27	30	30	30	34	25	52
109	----	----	97	----	----	----	109	80	89	80	81	86	89	90	80	51	25	28	28	28	32	22	51
108	----	----	96	----	----	----	108	79	88	79	81	85	88	89	79	50	22	26	27	27	30	20	50
107	----	----	96	----	----	----	107	78	86	77	80	84	87	88	78	49	20	25	25	25	27	18	49
106	----	----	95	----	----	----	106	77	85	75	79	83	86	86	77	48	17	23	23	22	25	16	48
105	----	99*	95	----	----	----	105	76	84	74	77	81	85	85	76	47	15	21	20	20	22	15	47
104	----	98	95	99*	----	----	104	75	83	73	75	80	83	83	75	46	13	20	17	18	20	13	46
103	----	98	94	98	----	----	103	74	82	72	74	79	82	82	74	45	11	18	15	16	18	12	45
102	----	97	94	98	----	----	102	73	80	71	72	77	80	80	73	44	10	16	13	15	17	10	44
101	----	97	94	98	----	----	101	72	78	70	70	76	78	78	72	43	8	15	12	13	15	8	43
100	----	97	93	98	----	----	100	71	77	68	68	75	77	77	71	42	6	13	10	11	13	6	42
99	----	96	93	97	----	----	99	70	75	66	66	74	75	75	70	41	5	11	8	10	12	5	41
98	99*	96	92	97	----	----	98	69	73	64	65	73	73	73	69	40	4	10	6	8	10	4	40
97	98	95	92	97	----	----	97	68	70	62	63	71	71	71	68	39	4	8	5	7	9	3	39
96	98	95	91	97	----	----	96	67	67	60	61	70	70	70	67	38	3	7	5	6	7	3	38
95	98	94	91	97	----	----	95	66	65	59	60	68	67	67	66	37	3	6	4	5	6	2	37
94	97	93	90	96	----	----	94	65	62	57	58	65	63	63	65	36	3	5	4	4	5	2	36
93	97	92	90	96	----	----	93	64	60	56	56	63	60	60	64	35	2	4	3	4	4	1*	35
92	97	91	90	96	----	----	92	63	57	54	55	60	58	57	63	34	2	4	3	3	3	----	34
91	97	90	89	95	----	----	91	62	55	53	53	57	55	55	62	33	2	3	2	3	3	----	33
90	96	89	88	95	99*	----	90	61	54	52	52	55	54	54	61	32	1*	3	2	2	2	----	32
89	96	88	88	95	98	----	89	60	52	51	51	53	52	52	60	31	----	3	2	2	2	----	31
88	96	87	87	94	97	99*	88	59	50	50	50	50	50	50	59	30	----	2	2	1*	2	----	30
87	95	87	86	94	96	98	87	58	48	48	48	47	48	46	58	29	----	2	1*	----	1*	----	29
86	95	86	86	93	95	97	86	57	46	45	44	45	45	42	57	28	----	1*	----	----	----	----	28

* Percentile norms for grade-equivalents not provided at the top or bottom of the table will be the same as the highest or lowest percentile rank given.

Table III. Percentile Grade Norms. Grade Six

Grade Equivalent	Percentile Rank						Grade Equivalent	Grade Equivalent	Percentile Rank						Grade Equivalent	Grade Equivalent	Percentile Rank						Grade Equivalent
	Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total			Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total			Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total	
115	99*	----	----	----	----	----	115	86	71	74	77	75	80	79	86	57	27	27	27	25	23	20	57
114	98	----	----	----	----	----	114	85	70	73	76	74	78	77	85	56	25	25	25	23	21	17	56
113	97	----	----	----	----	----	113	84	69	71	75	73	77	75	84	55	23	24	24	20	20	15	55
112	96	----	----	99*	----	----	112	83	68	70	74	71	75	74	83	54	22	22	22	18	18	13	54
111	95	99*	----	98	----	----	111	82	66	69	73	70	74	72	82	53	20	20	20	17	17	12	53
110	94	98	----	98	----	----	110	81	65	68	71	69	72	70	81	52	17	18	18	15	16	10	52
109	93	98	----	97	----	----	109	80	64	67	70	67	70	69	80	51	15	17	17	14	15	8	51
108	92	97	----	97	----	99*	108	79	63	65	68	65	68	67	79	50	13	15	15	12	14	6	50
107	91	97	----	96	----	98	107	78	62	63	66	63	67	65	78	49	11	13	13	11	12	5	49
106	90	96	----	95	99*	98	106	77	61	61	64	62	65	63	77	48	10	12	12	10	11	4	48
105	90	96	----	95	98	97	105	76	60	60	62	60	63	61	76	47	8	10	10	9	10	4	47
104	89	95	99*	95	98	97	104	75	58	59	60	59	62	60	75	46	7	9	8	8	8	3	46
103	88	94	98	94	98	97	103	74	57	57	59	57	60	58	74	45	6	8	6	7	7	2	45
102	87	93	98	93	97	96	102	73	56	56	57	56	58	56	73	44	5	7	5	6	6	2	44
101	87	92	97	92	97	96	101	72	54	54	55	54	56	55	72	43	5	6	5	5	5	1*	43
100	86	91	97	92	96	95	100	71	53	53	54	53	54	54	71	42	4	5	4	5	4	----	42
99	85	90	96	91	95	95	99	70	51	52	52	51	52	52	70	41	3	5	3	4	4	----	41
98	84	89	95	90	94	94	98	69	50	50	50	50	50	50	69	40	3	4	3	4	3	----	40
97	83	88	94	89	93	93	97	68	48	49	48	48	47	47	68	39	2	4	3	3	2	----	39
96	82	86	92	88	92	92	96	67	46	47	46	46	45	45	67	38	2	4	3	3	1*	----	38
95	81	85	90	86	91	90	95	66	45	45	44	44	43	43	66	37	1*	3	2	2	----	----	37
94	80	84	88	85	90	89	94	65	43	43	42	42	40	40	65	36	----	3	2	1*	----	----	36
93	79	83	87	84	89	88	93	64	42	41	40	40	38	37	64	35	----	3	2	----	----	----	35
92	78	82	85	83	88	86	92	63	40	40	39	38	36	35	63	34	----	2	2	----	----	----	34
91	77	80	84	82	87	85	91	62	37	37	37	36	33	33	62	33	----	2	1*	----	----	----	33
90	76	79	83	80	85	84	90	61	35	35	35	34	32	30	61	32	----	2	----	----	----	----	32
89	75	78	82	79	84	83	89	60	33	33	33	32	30	27	60	31	----	2	----	----	----	----	31
88	74	77	80	77	83	81	88	59	30	30	32	30	27	25	59	30	----	1*	----	----	----	----	30
87	73	75	79	76	81	80	87	58	28	28	30	28	25	23	58								

Table IV. Percentile Grade Norms. Grade Seven

Grade Equivalent	Percentile Rank						Grade Equivalent	Grade Equivalent	Percentile Rank						Grade Equivalent	Grade Equivalent	Percentile Rank						Grade Equivalent
	Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total			Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total			Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total	
117	99*	----	----	----	----	----	117	90	63	67	69	67	70	69	90	63	27	25	23	23	18	18	63
116	98	----	----	----	----	----	116	89	61	65	67	65	68	67	89	62	25	23	21	21	17	16	62
115	97	----	----	99*	----	----	115	88	60	64	65	64	66	65	88	61	24	22	20	20	15	15	61
114	96	99*	----	98	----	----	114	87	59	62	63	62	64	63	87	60	21	20	19	18	14	13	60
113	95	98	----	97	----	----	113	86	58	60	61	60	62	61	86	59	20	19	17	17	13	12	59
112	93	98	----	96	----	99*	112	85	57	58	60	59	60	60	85	58	18	17	16	15	12	10	58
111	90	97	----	95	99*	98	111	84	55	57	59	58	59	59	84	57	17	16	15	14	11	8	57
110	89	97	----	94	98	98	110	83	54	55	57	56	57	57	83	56	15	15	14	13	10	7	56
109	88	96	----	93	98	97	109	82	53	54	55	54	55	55	82	55	13	14	12	11	9	6	55
108	86	95	----	92	97	97	108	81	52	53	53	53	53	53	81	54	12	12	11	10	8	5	54
107	85	94	----	91	97	96	107	80	51	52	51	51	51	51	80	53	10	11	10	9	7	5	53
106	84	92	99*	90	96	95	106	79	50	50	50	50	50	50	79	52	9	10	9	8	6	4	52
105	83	90	98	89	95	94	105	78	48	48	48	48	48	47	78	51	7	8	8	7	5	3	51
104	82	88	98	88	95	93	104	77	47	46	46	45	45	45	77	50	6	7	7	6	5	3	50
103	80	87	97	87	94	92	103	76	45	44	44	43	43	43	76	49	5	6	6	5	4	2	49
102	79	85	96	86	92	90	102	75	44	42	42	40	40	40	75	48	5	5	5	5	4	2	48
101	78	84	95	85	90	88	101	74	43	40	40	38	38	37	74	47	4	5	5	4	3	1*	47
100	77	83	93	84	89	87	100	73	42	38	39	37	36	35	73	46	4	4	4	4	3	----	46
99	75	82	90	82	87	85	99	72	40	37	37	35	34	33	72	45	3	4	3	3	2	----	45
98	74	80	88	80	85	83	98	71	39	36	35	33	32	30	71	44	3	3	3	3	2	----	44
97	72	79	85	79	83	82	97	70	37	34	33	31	30	29	70	43	2	3	3	2	1*	----	43
96	70	77	83	77	82	80	96	69	35	33	32	30	29	27	69	42	2	3	2	2	----	----	42
95	69	75	80	75	80	79	95	68	34	32	30	29	27	26	68	41	2	2	2	1*	----	----	41
94	68	73	77	73	77	77	94	67	33	30	29	27	25	25	67	40	1*	2	2	----	----	----	40
93	67	72	75	72	75	75	93	66	31	29	27	26	23	24	66	39	----	2	2	----	----	----	39
92	65	70	73	70	74	73	92	65	30	27	25	25	21	22	65	38	----	2	1*	----	----	----	38
91	64	68	70	68	72	70	91	64	29	26	24	24	20	20	64	37	----	1*	----	----	----	----	37

* Percentile norms for grade-equivalents not provided at the top or bottom of the table will be the same as the highest or lowest percentile rank given.

Table V. Percentile Grade Norms. Grade Eight

Grade Equivalent	Percentile Rank						Grade Equivalent	Grade Equivalent	Percentile Rank						Grade Equivalent	Grade Equivalent	Percentile Rank						Grade Equivalent
	Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total			Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total			Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total	
118	99*	----	----	99*	----	----	118	93	55	56	57	57	58	58	93	68	22	17	15	15	13	11	68
117	98	99*	----	98	----	----	117	92	54	54	55	55	56	56	92	67	20	16	14	14	11	10	67
116	97	98	----	97	99*	----	116	91	53	53	53	53	54	54	91	66	19	15	13	13	10	9	66
115	96	97	----	96	98	----	115	90	51	52	51	52	52	52	90	65	17	14	12	12	9	8	65
114	95	97	----	95	97	----	114	89	50	50	50	50	50	50	89	64	16	13	11	11	8	7	[illegible]
113	90	96	----	94	97	99*	113	88	49	48	48	48	48	47	88	63	15	12	10	10	7	6	63
112	85	95	----	92	96	97	112	87	48	46	46	46	46	45	87	62	14	11	9	9	6	5	62
111	83	94	99*	90	95	96	111	86	47	44	44	44	44	43	86	61	13	10	8	8	6	5	61
110	82	92	98	88	95	95	110	85	45	42	42	42	42	40	85	60	12	9	7	7	5	4	60
109	80	90	98	87	94	94	109	84	44	40	40	40	40	37	84	59	11	8	6	6	5	4	59
108	78	89	98	85	93	92	108	83	43	38	38	39	38	35	83	58	10	7	5	5	4	3	58
107	77	87	97	84	92	90	107	82	42	36	36	37	36	33	82	57	9	6	5	5	4	3	57
106	75	85	97	83	90	88	106	81	40	34	34	35	34	30	81	56	8	6	4	4	3	3	56
105	74	83	96	81	89	87	105	80	39	33	32	33	32	29	80	55	7	5	3	4	3	2	55
104	72	80	95	80	87	85	104	79	37	31	30	31	30	28	79	54	6	5	3	3	3	2	54
103	70	78	93	77	85	83	103	78	35	30	29	30	29	26	78	53	5	4	3	3	2	2	53
102	69	75	90	75	83	80	102	77	34	29	28	29	27	25	77	52	5	4	2	3	2	1*	52
101	67	73	88	73	80	77	101	76	33	27	26	27	25	23	76	51	4	3	2	2	2	----	51
100	65	70	85	71	77	75	100	75	31	26	25	25	23	22	75	50	4	3	2	2	2	----	50
99	64	68	80	70	75	73	99	74	30	25	23	23	21	20	74	49	3	3	1*	2	1*	----	49
98	62	65	75	68	73	70	98	73	29	23	22	21	20	18	73	48	3	2	----	2	----	----	48
97	60	63	70	65	70	68	97	72	27	22	20	20	18	17	72	47	3	2	----	1*	----	----	47
96	59	60	66	63	67	65	96	71	25	20	19	19	17	15	71	46	2	2	----	----	----	----	46
95	58	59	60	60	63	63	95	70	24	19	17	17	15	14	70	45	2	1*	----	----	----	----	45
94	57	58	59	58	60	60	94	69	23	18	16	16	14	12	69	44	1*	----	----	----	----	----	44

Table VI. Percentile Grade Norms. Grade Nine

Grade Equivalent	Percentile Rank						Grade Equivalent	Grade Equivalent	Percentile Rank						Grade Equivalent	Grade Equivalent	Percentile Rank						Grade Equivalent
	Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total			Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total			Pt. I	Pt. II	Pt. III	Pt. IV	Pt. V	Total	
122	----	99*	----	----	----	----	122	97	48	48	46	48	48	47	97	72	24	16	11	18	15	15	72
121	----	98	----	----	----	----	121	96	48	46	44	47	46	45	96	71	23	15	10	17	13	14	71
120	99*	98	----	----	----	----	120	95	47	44	42	46	44	43	95	70	21	13	9	15	12	12	70
119	98	97	----	99*	----	----	119	94	46	43	40	45	43	42	94	69	20	12	8	14	10	11	69
118	97	97	----	98	99*	----	118	93	45	42	38	44	41	40	93	68	19	11	7	12	9	10	68
117	96	96	----	97	98	----	117	92	44	40	37	44	40	39	92	67	18	10	6	11	8	8	67
116	95	96	----	96	97	----	116	91	43	39	35	43	39	38	91	66	16	9	6	10	7	7	66
115	93	95	----	95	96	----	115	90	42	38	34	42	38	37	90	65	15	8	5	9	6	6	65
114	90	94	----	94	95	99*	114	89	41	37	32	41	37	35	89	64	14	7	4	7	6	5	64
113	85	92	99*	92	94	97	113	88	40	36	30	40	36	34	88	63	12	7	4	6	5	5	63
112	83	90	98	90	92	95	112	87	39	35	29	39	35	33	87	62	11	6	3	5	5	4	62
111	80	88	98	88	90	93	111	86	38	33	28	38	34	31	86	61	10	5	2	4	4	3	61
110	79	85	97	87	89	90	110	85	37	32	27	37	33	30	85	60	8	5	2	4	4	3	60
109	77	83	97	85	88	88	109	84	36	31	26	35	32	29	84	59	7	4	1*	3	3	2	59
108	75	80	96	84	87	87	108	83	36	30	25	34	31	28	83	58	6	4	----	3	3	2	58
107	74	78	96	83	85	85	107	82	35	29	24	33	30	27	82	57	5	3	----	2	2	1*	57
106	72	75	95	81	83	83	106	81	34	28	23	32	29	26	81	56	5	3	----	2	2	----	56
105	70	73	90	80	82	82	105	80	33	27	21	31	27	25	80	55	4	2	----	1*	1*	----	55
104	67	70	85	77	80	80	104	79	32	25	20	30	25	24	79	54	4	2	----	----	----	----	54
103	63	65	80	75	75	75	103	78	31	24	19	29	23	23	78	53	8	2	----	----	----	----	53
102	60	60	75	73	70	70	102	77	30	23	17	27	21	21	77	52	3	1*	----	----	----	----	[illegible]
101	56	57	70	70	65	60	101	76	29	21	16	25	20	20	76	51	2	----	----	----	----	----	51
100	53	53	60	60	60	55	100	75	28	20	15	24	18	19	75	50	2	----	----	----	---	----	50
99	50	50	50	50	50	50	99	74	26	19	14	21	17	17	74	49	1*	----	----	----	----	----	49
98	49	49	48	49	49	48	98	73	25	17	12	20	16	16	73								

* Percentile norms for grade-equivalents not provided at the top or bottom of the table will be the same as the highest or lowest percentile rank given.

CLASS SUMMARY

A Summary Report of Grade-Equivalent Scores of Individual Pupils is provided with each package of the tests. This form may be used to provide a convenient record of the performance of the class or group tested. A reduced facsimile of the form will be found below. The summary report provides for a record of the results for all four tests in the battery — reading, work-study skills, language, and arithmetic.

If you have not administered the entire battery, you may, of course, use only that part of the form which pertains to the test that you have given.

When you have completed scoring, transcribing, and converting the scores on the answer sheets of the test booklets, you are ready to prepare the summary report. While the summary report form is intended to be used for recording grade-equivalents of the pupils' raw scores, it may also be used for recording percentile ranks or chronological age-equivalents. In the latter case, you will previously have recorded these age-equivalents or ranks on the answer sheets according to the directions given on pages 11 and 12 of this manual.

Sch. No.
Bldg. No.

A SUMMARY REPORT OF GRADE-EQUIVALENT SCORES OF INDIVIDUAL PUPILS

on the Iowa Every-Pupil Tests of Basic Skills for Grades 3 to 9

Name of school building: ------------------------City or District: ------------------County: ------------------------State: -------------------------

(The pupils whose scores are reported on this sheet* are just beginning or will shortly begin the -------- (first-second) semester of the ---------- (3rd-9th) grade.) Date: --------------------------

* Use a separate sheet for each grade group in the building. If more than one sheet is necessary for a single grade group, clip sheets together.

Pupil No.	Names of Pupils (Arrange in alphabetical order of last names. Write last name first)	Sex (Write B or G)	Age in Years Last Birthday	Months Since Last Birthday	Test A: Reading		Test B: Work-Study Skills						Test C: Language Skills						Test D: Arithmetic Skills			
					Part I	Part II	Part I	Part II	Part III	Part IV	Part V	Total	Part I	Part II	Part III	Part IV	Part V Elem. only	Total	Part I	Part II	Part III	Total
1																						
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
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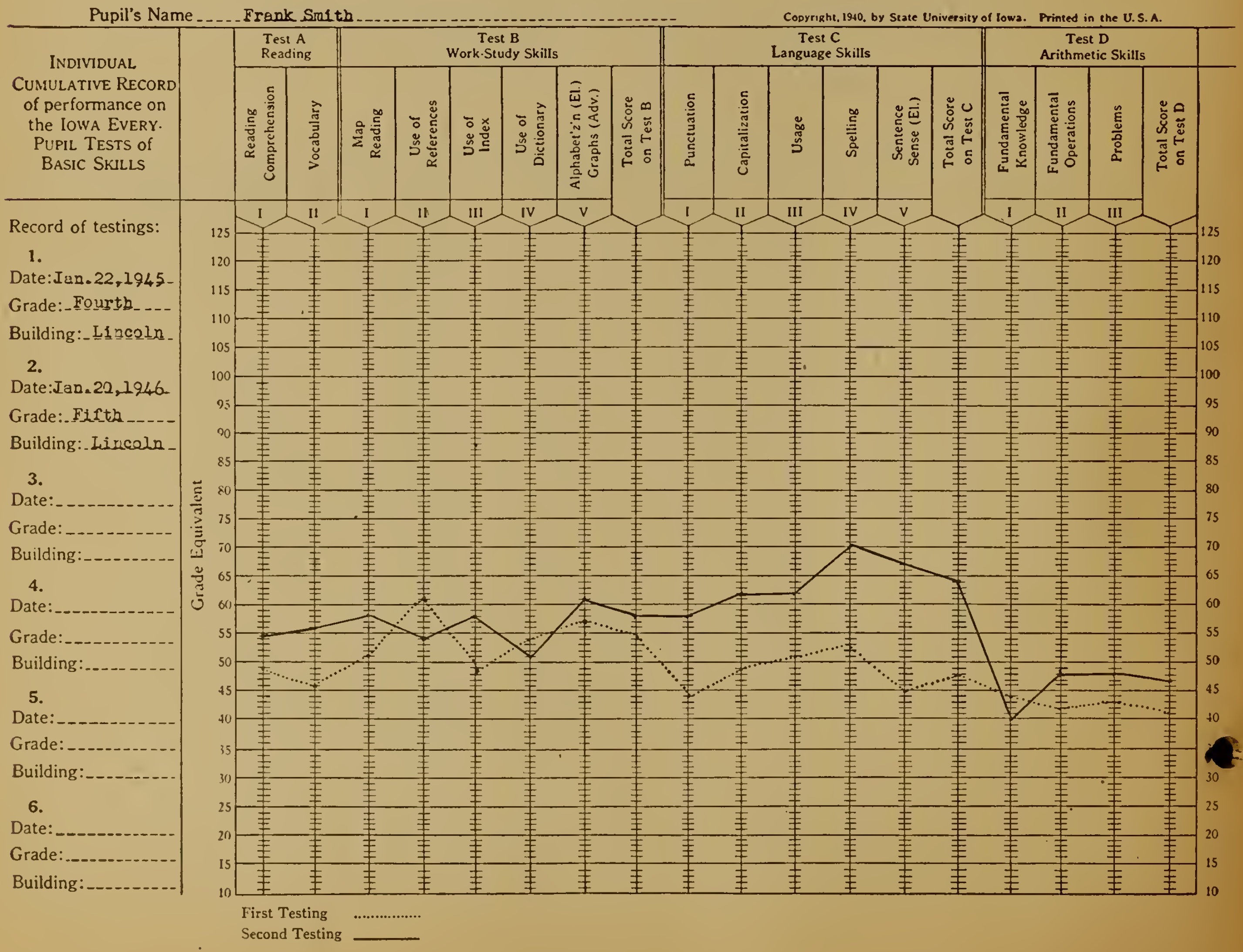
15																						
16																						
17																						
18																						
19																						
20																						
21																						
22																						
23																						

INDIVIDUAL PUPIL PROFILES

At the bottom of this page you will find a facsimile of the "Individual Cumulative Record Form." This form is not included with the package of tests, but may be ordered separately. You will note that it provides for a record of six separate testings of the pupil. This chart permits the plotting of the scores for all tests in the battery along a "Grade-Equivalent Scale" which applies to all tests within each battery, to all forms of each test, and to the Elementary as well as to the Advanced Battery.

To prepare the pupil profile, refer either to the answer sheets, where the grade-equivalents have been recorded, or to the summary report of grade-equivalent scores of individual pupils, if that summary has been previously prepared. The procedure in making the profile is as follows: Along each scale on the Cumulative Record Form, mark the position of the pupil's *grade-equivalent* score on the corresponding part of the battery. For example, if you are recording the result on Part I of Test B (Map Reading), and you find on the answer sheet of the pupil's test booklet a grade-equivalent of 85 for this part of the test, make a mark on the scale for Part I on Test B at the value 85. Having marked each score on the appropriate scale, join the marks on adjacent scales with straight lines. The result will be the pupil's test profile. In the sample profile plotted on the form reproduced below, the pupil's grade-equivalents for Test B in the second testing were 58 for Part I, 54 for Part II, 58 for Part III, 51 for Part IV, 61 for Part V, and 58 for the total score.

When a second profile is being prepared, following the administration of a different form, it is well to use either a different type of connecting line or a different color.



Pupil's Name Frank Smith

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INDIVIDUAL CUMULATIVE RECORD of performance on the IOWA EVERY-PUPIL TESTS of BASIC SKILLS

Record of testings:

1.
Date: Jan. 22, 1945
Grade: Fourth
Building: Lincoln

2.
Date: Jan. 20, 1946
Grade: Fifth
Building: Lincoln

3.
Date:
Grade:
Building:

4.
Date:
Grade:
Building:

5.
Date:
Grade:
Building:

6.
Date:
Grade:
Building:

First Testing ....

Second Testing ————

Test A Reading
Reading Comprehension
Vocabulary
Test B Work-Study Skills
Map Reading
Use of References
Use of Index
Use of Dictionary
Alphabet'z'n (El.) Graphs (Adv.)
Total Score on Test B
Test C Language Skills
Punctuation
Capitalization
Usage
Spelling
Sentence Sense (El.)
Total Score on Test C
Test D Arithmetic Skills
Fundamental Knowledge
Fundamental Operations
Problems
Total Score on Test D
I
II
I
II
III
IV
V
I
II
III
IV
V
I
II
III
Grade Equivalent
125
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10

INTRODUCTION

The first step in the utilization of the Basic Skills test results in planning a program of remedial instruction for a class of pupils is to *identify* the major areas in which remedial instruction is *needed,* either by individual pupils or by the class as a whole.

The next step is to examine the local course of study to determine what provision has been made for the development of these skills, and to determine whether or not, in light of these provisions, the pupils have done as well as may reasonably be expected of them. The teacher should establish an arbitrary "standard" of performance on each part of the test. (Consultation with other teachers and with the administrative or supervisory officer is nearly always desirable in establishing these standards.) It will then be possible to identify the parts of the tests on which the performance was "below standard," that is, the major skills on which some or all of the pupils need remedial instruction.

These major skills having been identified, the next step should be a more detailed analysis of each skill. Any one of the major skills may be broken down into more specific skills. Skill in punctuation, for example, involves use of the comma to separate words in series, to set off an introductory phrase, to separate names of city and state, etc., and the pupils may be more in need of instruction on some of these points than on others. Hence, for each subtest, the major skill tested should be analyzed in detail, and the test papers of the pupils should be examined to discover with which of these detailed skills they are having most difficulty. After these highly specific skills have been determined, remedial exercises pertaining to them may be selected or devised.

For the convenience of the teacher, the remaining pages of this manual are devoted to detailed analyses of the type just suggested. For each major skill the more specific constituent skills are first listed and the test items concerned with these skills are identified. Then, following this analysis, a number of specific suggestions are offered concerning remedial procedures.

It should be recognized that the isolated development of the specific skills is only a part of the instructional program. Unless the skills are subsequently used by the child as an integral part of his attack on everyday problems, this isolated instruction will be of little value. There is no point, for example, in having a pupil master the various skills in the use of the dictionary if he is not later given opportunities or is not encouraged to use these skills in his regular school work. It is the responsibility of all teachers in all subjects to be constantly on the alert for opportunities to draw the pupils' attention to situations in which the basic skills function, and thus to develop the *habitual* exercise of these skills in all aspects of the pupils' learning activities. Remedial or corrective instruction concerned with isolated detailed skills, of the types suggested in the remaining pages of this manual, *must* be followed up by a concerted effort by all teachers in all subjects to *maintain* these skills. The efforts of the language teacher, for example, to correct certain errors in the use of the comma will be of little avail if other teachers in other subjects ignore or permit such errors in the pupils' written work in those subjects. Eventually, then, the pupils' final status with reference to these skills will depend, not so much upon the amount of isolated drill he has received on them, but upon the effectiveness with which instruction in all subjects has been *integrated* or correlated to the end of providing adequate opportunity for the correct application of these skills in a natural setting.

It should be noted that in all remedial instruction it is highly important to secure pupil assumption of responsibility in the remedial program. Unless the children see a *personal* need for remedial exercises, the results will almost inevitably be unsatisfactory. The pupils must be convinced of the importance of the detailed skills tested, they must see or be shown why one response is correct and the others are wrong, and must recognize clearly their *own* mistakes. The teacher can do much toward securing pupil responsibility by returning the used test booklets to the pupils and discussing individual exercises with them. Not only will this procedure make the pupils conscious of their own errors, but the test exercises themselves will constitute excellent instructional materials for the class as a whole.

It may be noted, finally, that the whole problem involves more than identifying and correcting pupil and class *weaknesses.* It will frequently be found that certain pupils are far in advance of the "standards" set for their grade, and it may be desirable, not only to excuse these pupils entirely from routine drills, but to find for them stimulating and enriching activities of other types.

CLASSIFICATION OF SKILLS AND SUGGESTIONS FOR REMEDIAL WORK

PART I: MAP READING

Classification of Items in Test B, Part I

The following table identifies the skill tested by each item in Part I of Test B and is preceded by an explanation of the code used to identify the skills.

Skills Tested

1. Ability to visualize the represented area in its natural plane and to read direction correctly (1–a, To read direction; 1–b, To read direction of land slope from direction of river flow). 2. Recognizing and interpreting standard map symbols (2–a, To recognize symbols; 2–b, To interpret upstream and downstream). 3. Identifying and visualizing symbols with the use of a key (3–a, To use scale of miles; 3–b, To interpret symbols by use of a key). 4. Ability to get facts and information from parallels and meridians (4–a, To give the latitude and longitude of a certain place; 4–b, To find direction by use of parallels or meridians; 4–c, To recognize the general pattern of a time zone; 4–d, To estimate man's ways of living in a region from location of the region in the world sun pattern; 4–e, To recognize differences in seasons and hours of daylight in different latitudes). 5. Ability to apply physical facts to map situations. 6. Ability to read and interpret facts from pattern maps (6–a, To recognize what it is that a given map portrays and to recognize areas to which a certain symbol applies; 6–b, To read facts directly from a single pattern map; 6–c, To read facts directly from two pattern maps; 6–d, To obtain facts from several pattern maps and use them in estimating how man probably lives in the region).

Be sure to use the proper table for the form you have administered.

Table VII. Map Reading

Form L

ITEM	SKILL	ITEM	SKILL	ITEM	SKILL	ITEM	SKILL
1	1-b	11	4-e	21	6-b	31	6-b
2	5	12	3-a	22	6-c	32	6-d
3	4-e	13	2-b	23	6-b	33	6-b
4	4-d	14	4-a	24	6-d	34	6-d
5	5	15	3-b	25	6-d	35	6-d
6	5	16	2-a	26	6-d	36	6-d
7	4-b	17	2-a	27	6-d	37	6-d
8	5	18	2-a	28	6-b		
9	4-b	19	3-b	29	6-c		
10	4-c	20	5	30	6-d		

Form M

ITEM	SKILL	ITEM	SKILL	ITEM	SKILL	ITEM	SKILL
1	3-a	11	4-e	21	4-e	31	6-c
2	2-a	12	5	22	4-a	32	6-b
3	1-b	13	4-d	23	6-b	33	6-d
4	3-b	14	4-b	24	6-b	34	6-b
5	3-b	15	4-c	25	6-b	35	6-c
6	2-a	16	5	26	6-d	36	6-d
7	2-b	17	5	27	6-d	37	6-b
8	5	18	4-e	28	6-d	38	6-b
9	4-a	19	4-d	29	6-d	39	6-d
10	5	20	4-d	30	6-c	40	6-d

Form N

ITEM	SKILL	ITEM	SKILL	ITEM	SKILL	ITEM	SKILL
1	3-b	12	2-a	23	4-d	34	6-c
2	2-a	13	4-b	24	2-b	35	6-c
3	2-a	14	4-e	25	4	36	6-c
4	3-a	15	5	26	6-b	37	6-d
5	2-a	16	2-a	27	6-a	38	6-d
6	2-b	17	4-a	28	6-b	39	6-d
7	4-a	18	4-d	29	6-c	40	6-d
8	4-b	19	5	30	6-d	41	6-c
9	1-b	20	4-c	31	6-c	42	6-d
10	5	21	4-e	32	6-c		
11	5	22	4-e	33	6-d		

Form O

ITEM	SKILL	ITEM	SKILL	ITEM	SKILL	ITEM	SKILL
1	3-b	12	4-b	22	4-e	32	6-b
2	3-a	13	4-d	23	5	33	6-d
3	5	14	4-c	24	5	34	6-d
4	1-b	15	5	25	4-a	35	6-d
5	4-b	16	4-d	26	6-b	36	6-c
6	5	17	5	27	6-b	37	6-d
7	2-b	18	2-b	28	6-b	38	6-b
8	4-a	19	4-d	29	6-d	39	6-c
9	3-b	20	4-e	30	6-c	40	6-d
10	2-a	21	5	31	6-d	41	6-d
11	5						

Skills Involved

A map employs certain symbols and conventions which form a language. In as far as the reader can interpret or read meaning into these symbols and conventions, a map is his tool for getting a vast amount of factual information. Map reading involves a group of specific abilities. In developing these abilities, the teacher faces the same problems that the primary teacher encounters in training the pupil to read the printed page.

1. *Ability to visualize the represented area in its natural plane and to read direction correctly.* A map is a conventional picture of a region as the region lies spread out on a horizontal plane. It has six direc-

tions, as any natural area has six directions — north, south, east, west, *up*, and *down*. When a map is placed on a flat surface in the proper directional relationship, it is in the position of the land it pictures. North is that portion of the pictured region that is nearest the north pole; south, that nearest the south pole. A map, considered as a pictured region, has no top or bottom, as the earth has no top or bottom. In any earth region, the directions are clockwise, north, east, south, west; so they are on the map. *Up* is away from the center of the earth; *down* is toward the earth's center. *Up* and *down* on a map in a horizontal position are as the child has always conceived them. In the child's thinking, then, rivers run downhill. A large number of children and many adults consider that a river cannot run toward the north. They are accustomed to a map in a vertical position; they consider north as the top of the map and therefore confuse *up* and *north*. A teacher can test a pupil on this by using the textbook map of a region with which he is unfamiliar and asking him to show her, by moving his finger along the line that represents a north flowing river, the direction in which the water flows. The Mackenzie in North America, the Magdalena in South America, and the Nile in Africa are good rivers to use. The teacher may be surprised to find how many pupils do not know that the line represents a river. In a child's early map-reading experiences, the map should be placed in its natural position. A child should not be asked to read facts from a vertical map until his direction concepts are fixed — until he has had concrete experiences with rivers flowing in different directions, especially toward the north — until he has visualized land sloping in all directions. When the map is first placed in a vertical position, it should be oriented for the child: he should realize that this conventionalized picture of the region has been thrown out of its natural plane. The part of the region nearest the north pole becomes the top of the map, the part nearest the south pole the bottom of the map. *Up* is toward the reader, *down* away from him.

2. *Recognizing and interpreting standard map symbols.* Certain map symbols are standardized — the symbols for a city, a river, a coast line, land and water on a colored map, a delta, peninsula, island, strait, isthmus, and lake. The dot on a map is meaningful only as the reader visualizes in that spot buildings, streets, parks, people at work and play, etc. In the meandering line that symbolizes a river, the reader must see a stream of water, narrow at its source, widening as it flows and as tributaries join it, carrying sediment, flowing into a body of quiet water. The terms *upstream* and *downstream* can be made intelligible only as the child visualizes water flow.

Many symbols are more difficult to recognize on an outline map than on a colored or crosshatched map. This is caused by the fact that it is difficult to distinguish between land and water; consequently, distinguishing between islands and lakes, or river and coast lines, becomes difficult. Activities in recognizing and coloring the water areas of outline maps should be supervised until the child has developed ability to recognize these factors independently.

3. *Identifying and visualizing symbols with the use of a key.* Many symbols and conventions such as those for mountains, railroads, tunnels, and glaciers are not standardized, and can be read only by the use of a key or legend. Therefore, practice in reading a legend is important. Distance can best be read from a map through the use of the scale of miles. Pupils should be taught to use the scale of miles with care — it is a tool of only approximate accuracy at best. The edge of a paper should be laid so that it passes through the two points between which the distance is to be measured. These two points should be marked on the paper edge, which then should be laid along the scale of miles to determine the length of the distance. A concept of distance or area is difficult to establish. In this day of automobiles, however, most children have done some traveling. They have some idea of how long it takes to go from place to place in their own neighborhood. A walk of a mile from the school will give some concrete idea of a mile as a measuring tool.

4. *Ability to get facts and information from parallels and meridians.* Latitude and longitude usually are taught together, and neither has been treated as a practical tool. As a result, few people have control of these tools; instead, a confused factual knowledge is common. In developing ability to use these tools, the following suggestions should be helpful:

Only the facts and concepts concerning the tool which are necessary in its immediate use should be given to the pupil at any one time.

Ability to read direction through the use of parallels and meridians involves: (1) visualization of the earth as a sphere, turning on an axis, the ends of which are the north and south poles; (2) visualization of meridians as imaginary lines running north and south from pole to pole; (3) visualization of parallels as imaginary lines running around the world in an east-west direction parallel to the equator, an imaginary line halfway between the poles; (4) ability to recognize and follow these lines on a map.

Ability to locate a place by use of parallels and meridians involves: (1) knowledge of the names of the parallels and meridians; (2) ability to identify them; (3) ability to follow a meridian and a parallel until they meet.

Ability to determine the time zone of a given place involves: (1) understanding of the change in sun time; (2) visualization of the division of the earth into time zones; (3) understanding of the difference of time in the different zones in order of their placement east of the prime meridian.

Ability to use latitude as a measuring tool involves: (1) ability to identify the equator; (2) knowledge that a degree of latitude contains 70 miles; (3) understanding of the world sun movement pattern and its relationship to natural and human factors; (4) ability to locate a place or region in the world sun pattern.

Latitude as a measuring tool should be mastered at an early level, because of its value as an interpretative tool. Longitude as a measuring tool, if mastered at all, should be handled at a much later level. Confusion in these terms results from introducing them to the child at the same time.

5. *Ability to apply physical facts to map situations.* Knowledge of physical facts, such as the fact that the presence of mountains changes the amount of rainfall in near-by sections, when used in connection with facts read from a map furnishes a basis for estimating the character of natural factors in a region.

6. *Ability to read and interpret facts from pattern maps.* Many natural and human factors are distributed over the earth in patterns. Sun movement is a pattern, in which there is practically no change from year to year. Elevation changes so slowly that, as a world pattern, it is relatively static. Rainfall and temperature, while they differ from year to year, furnish a relatively fixed pattern through the use of averages. Population distribution, crop distribution, and domestic animal distribution are human factors. Their change is slow, but they are much less static than the natural factors previously mentioned. Forest distribution, wild animal distribution, and mineral distribution are natural factors, but they are affected to such a large extent by the distribution of man and the use man makes of land and minerals that they change much as do the human factors mentioned.

Ability to visualize such distribution patterns is very important. Most social problems find their beginnings in the unequal distribution of population and natural resources. Understanding of most social problems depends largely upon ability to visualize these distribution patterns and interpret facts in relationship to them. Probably the most important pattern is that of population distribution. Distribution of rainfall, temperature, elevation, and natural resources are factors that influence man's choice of a place to live. The number of men who live in a given region affects the distribution of forests, minerals, crops, and animals in that region. Ability to use these pattern concepts is fundamental in the fields of social subjects as well as geography.

The pattern map is one of the most effective tools in giving information concerning these distributions. The child should be given experience in reading color, contour, dot, and crosshatched types.

The legend or key of a pattern map furnishes the symbol through which the mapped information can be interpreted. To be effective as a tool of interpretation, the factor symbolized must be visualized in all its relationships. For instance, a symbol on a population map shows that from two to eight people live in each square mile of a certain area in the pictured region. To interpret this, the reader must visualize how people live in a region where there are only from two to eight people to the square mile: the kind of homes in which they live, the possibilities of making a living, the type of social life which prevails. The average American family is four persons. Then, in such a region, there cannot be more than two average families per square mile, two houses in a square mile. That would provide for each family an average of 320 acres. If some people lived in towns, there would be more than 360 acres for some families in the country. The towns in such a region must be small. How do people live in small towns? What types of work can men do in a region in which there are 360 or more acres of land for each family? Will land be cheap or expensive? How will children get an education? Where will they play? Compare with this region one in which the symbol shows there are 600 people to the square mile.

Suggestions for Developing Map-Reading Skills

The major objective of any social study or geography program is the development of understandings. A program designed to develop ability to use the tools necessary for gathering the facts needed in developing and applying understandings should introduce tools and provide practice for their mastery at the time when the tool is needed. If tools have not been mastered and a remedial program is necessary, the study of any region, at an advanced level, will furnish opportunity for reintroduction and practice of all map-reading skills. The most satisfactory remedial programs in map reading are those built into the regular program of study. The following suggestions may be helpful:

1. The exercises in the map-reading test should be

analyzed to determine the ability tested by each exercise.

2. Class response to each exercise should be studied to determine the abilities that need class attention.
3. Individual test errors should be studied to determine the need for individual instruction.

[illegible] Series of textbooks should be examined to determine the devices experts use to develop map-reading abilities. Map-reading programs can be traced through some series. Many such programs will be found in the lower books of the series.

5. The subject matter of the course of study or the text should be examined to determine the future opportunities to develop and furnish practice in the abilities that need development.
6. Individual pupil activity is necessary to develop abilities and confidence in using them independently. Much such activity can be obtained in a class situation by requiring each child to use the map in his text rather than class use of a wall map. To supervise and check responses in such map usage, the teacher must move around the room to check individual reactions. This can be done quickly with a little practice. Every child need not be checked on every response.
7. The problems on which children work and the instructional procedure used should be of such a type that the children will be forced to employ skills of the type tested; for example, children concerned with a question of this type, "How does the annual rainfall of central Oklahoma compare with that of central Indiana?" should not be satisfied or be permitted to stop when they have found a verbal answer. The facts concerning amount of rainfall can have maximum meaning only in relationship to other areas. No better source than a rainfall map can be found for securing a grasp of such relationships.
8. The achievement of a remedial program should be checked often enough to provide needed individual instruction. Tests similar to those in this program can be made by the teacher. An ingenious teacher can find ways of testing that require little class time and furnish the needed information.
9. The following detailed suggestions are offered for improving various specific map-reading skills:
   - (*a*) Give practice in reading direction from a map, asking questions such as "What direction is Chicago from Milwaukee?" Have pupils locate by direction from some well-known point, places mentioned in the current news. It is a very good procedure to call to the children's attention the value of fixing in one's mind a few key reference points rather than trying to fix all.
   - (*b*) Have pupils trace the courses of rivers from source to mouth to show the direction of river flow. Local maps should be employed. If none are available, construction of them is a good project.
   - (*c*) Raise questions like "Find the delta of the Mississippi River" and "What islands are south of Florida?" to check understanding of map symbols.
   - (*d*) Give practice in using the scale of miles.
   - (*e*) Have frequent lessons on using a key to interpret symbols; for example, finding the mountainous regions of North America.
   - (*f*) Give practice in finding places by use of parallels and meridians.
   - (*g*) Do experiments which demonstrate how latitude and longitude are determined.
   - (*h*) Hold discussion lessons using maps to show that physical facts apply to map situations; for example, the fact that the presence of mountains changes the amount of rainfall in near-by sections.
   - (*i*) Have sets of outline maps with location questions attached, to which a child may turn to work on a skill in which he needs additional practice.
   - (*j*) Have a discussion map lesson as the beginning of study of a new region to obtain as many facts as possible about the new region from the map. Raise such questions as "What do you expect the people of the region to raise, since only about 20 inches of rain falls during the year?" (The limitations of rainfall as a sole guide should also be shown. Compare vicinity of London and western Kansas.)
   - (*k*) Have studies comparing conditions in cities or regions located in the same parallels.
   - (*l*) Give practice in reading and interpreting facts from pattern maps, for example, "According to the symbols on the map, how do people in a certain region live?"
   - (*m*) Discuss with the children the relationship between the zones and the sun's position. (This refers to the fact that the torrid zone is that portion of the earth's surface where at some time during the year the sun is directly overhead.)

PART II: USE OF REFERENCES

Skills Involved

Important skills measured by the test items on the use of references are:

Skills Tested

1. To recognize questions the answers to which may best be found in atlases or maps; 2. To recognize questions the answers to which may best be found in dictionaries; 3. To recognize questions the answers to which may best be found in encyclopedias; 4. To recognize questions the answers to which may best be found in yearbooks; 5. To recognize questions the answers to which may best be found in specific sources such as textbooks, globes, government publications, etc.

Classification of Items in Test B, Part II

The following is a sequential listing of all items in Test B, Part II, with the skill measured in each identified by code. This code employs the numbering assigned to the same skills as listed above.

Be sure to use the table for the form you have administered.

Table VIII. Use of References

Form L		Form M		Form N		Form O	
ITEM	SKILL	ITEM	SKILL	ITEM	SKILL	ITEM	SKILL
1	4	1	1	1	5	1	3
2	2	2	2	2	2	2	1
3	5	3	2	3	5	3	2
4	5	4	3	4	5	4	5
5	5	5	4	5	5	5	5
6	1	6	1	6	5	6	3
7	4	7	5	7	5	7	4
8	5	8	5	8	3	8	1
9	4	9	2	9	3	9	5
10	5	10	4	10	2	10	3
11	3	11	3	11	2	11	2
12	5	12	5	12	5	12	2
13	5	13	5	13	3	13	4
14	5	14	5	14	4	14	4
15	5	15	3	15	4	15	4
16	3	16	1	16	1	16	5
17	2	17	4	17	4	17	1
18	1	18	5	18	3	18	4
19	5	19	3	19	5	19	1
20	2	20	1	20	2	20	2
21	1						

Suggestions for Developing Ability to Use References

The knowledge of the type of reference to use in solving particular problems should properly be a by-product of the regular use of references. In schools which have no reference material of any kind and no access to a school or public library, mechanical drill aiming to raise the children's scores on the test is worse than useless. Children should be given practice in this skill only in case it is to be used in getting lessons, making reports, looking up data, and other real situations.

Although isolated drills similar to those in the test might profitably be given, there is no doubt that drill in connection with specific references is better. Following are suggestions which may be useful:

1. Children may be given a list of questions and asked to decide where the answers may be located. They may then check the correctness of their decisions by actually finding the answers to the questions. For example:
   (*a*) How is *precedence* pronounced?
   (*b*) Who invented the printing press?
   (*c*) Who said, "Give me liberty or give me death"?
   (*d*) What was the population of the United States in 1930?
2. When children make reports in class, the teacher may put on the board the titles of any sources, other than their own texts, which the children used.
3. Children may make lists of all source books available in their own school, such as dictionary, atlas, *Compton's Encyclopedia, World Book, World Almanac,* or others.
4. Different children may report on the types of material to be found in each source.
5. Children may make summaries of the reference material available in their school, with classifications of how the content in each is arranged. For example:

   Dictionary — alphabetically
   Atlas —
   Book of Knowledge —

PART III: USE OF THE INDEX

Skills Involved

The skills or abilities involved in the use of the index are clearly identified by the questions in the test. One of the simplest of these is the ability to alphabetize. A study made in connection with the Iowa Basic Skills Testing Program showed that many schools have been depending upon incidental learning of this ability, and that this incidental learning has not been sufficient. Since this ability is also needed in using dictionaries and encyclopedias, it probably deserves more attention than it has received.

Suggested Types of Exercises for Developing Skills in Use of Index

1. In each of the following questions, underline the word (or words) under which you would look in an index for the answer to that question.
2. From the list given after each question, choose all the words under which you would look in an index for the answer to that question.
3. After each question, write the subtopic under which you would look (in a sample index or an index in a certain text) for the answer to that question.
4. (As in the test) Give the number of the page on which you would look for the answer to each question.
5. (As in the test) On how many pages will you find information about a given topic?

The teacher will have an advantage over the test situation in that she will be able to use actual indexes. It is perhaps unnecessary to suggest that drill should certainly not stop with these mechanical features. It should include exercises in actually locating the answers on the given page of the test and giving brief answers. Moreover, pupils should not be allowed to search aimlessly for any material in other lessons, but should be required to use the index at every opportunity. The most useful way in which to teach children these index skills is by having them actually use an index in looking up material in geography, history, or science, or for some special report.

PART IV: USE OF DICTIONARY

There are several good workbooks and manuals on the use of a dictionary. The publishers of most dictionaries have guides for the teacher's use. The teacher can build many exercises of her own similar to those in the commercial dictionary workbooks.

As was suggested for the use of the index, further diagnosis than the total test scores may be needed. It should not be difficult for a teacher to discover whether her pupils' low scores are due to inability to alphabetize, lack of knowledge of symbols used, unfamiliarity with pronunciation keys, inability to choose which of several meanings to employ in a given context, or to other causes.

PART V: READING GRAPHS, CHARTS, AND TABLES

Skills Involved

In so far as children in a given grade use, either as texts or as reference material, books which contain charts, graphs, and tables, the development of ability to use such data should not be left to incidental teaching. Neither should children be required to spend time in mechanical drill on reading difficult graphs unlike any to be found in the books at their grade level.

Graphs, tables, and charts are tools for giving knowledge and, as such, require the use of specific skills and abilities. Anyone who is planning the remedial program must recognize these component parts of the ability of graphical interpretation and plan so that there is direct teaching of them. Trusting to incidental teaching is likely to prove expensive in the long run.

A child should be given the opportunity to learn how facts can be represented on a graph, and how these same facts can be shown by different kinds of graphs. He needs to learn what the parts of a graph are and what use is made of each. In other words, the language of graphs, tables, and charts must be put at his command. *Title, scale, axis, base line, main-item stub, subordinate-item stub, key,* and *label* must be a part of his study equipment — if not known by those names, at least recognized and used in actual graph-reading situations. Further, the use of graphs presumes that the child has a command of fundamental reading and arithmetic skills.

A simplified list of the abilities most important to efficient graph reading is given below.

Skills Tested

1. To comprehend from the title the topic on which a graph gives information.
2. To recognize from subtitles and row or column headings what is shown by each part of a graph.

3. To read amounts from a graph
    - (*a*) by using the scale (or scales) on bar and line graphs.
    - (*b*) by interpreting the sectors of a circle on circle graphs.
    - (*c*) by reading across in a table.
    - (*d*) by using special symbols and a key.
4. To compare two or more values read from a graph or table.
    - (*a*) by determining how many times greater one amount is than another.
    - (*b*) by determining the relationship between amounts.
5. To determine trends as shown on a line graph.
6. To realize that percentages and proportions do not give absolute amounts.
7. To determine underlying relationships through correct interpretation of a graph.
8. To grasp outstanding facts portrayed by a graph.
9. To determine rank from an unordered list, graph, or chart.

Use the table for the form you have administered.

Table IX. Reading Graphs, Charts, and Tables

Form L		Form M		Form N		Form O	
ITEM	SKILL	ITEM	SKILL	ITEM	SKILL	ITEM	SKILL
1	3-a	1	4-b	1	3-a	1	3-a
2	3-a	2	3-a	2	4-b	2	3-a
3	5	3	3-a	3	4-b	3	8
4	4-a	4	4-b	4	1	4	2
5	3-a	5	3-d	5	6	5	3-d
6	3-a	6	4-a	6	9	6	8
7	8	7	3-b	7	3-b	7	3-d
8	4-b	8	3-b	8	8	8	9
9	3-b	9	4-b	9	4-b	9	9
10	6	10	6	10	9	10	2
11	3-b	11	4-b	11	3-d	11	3-b
12	8	12	8	12	3-d	12	9
13	6	13	3-d	13	8	13	2
14	3-c	14	4-b	14	3-a	14	3-b
15	9	15	4-b	15	3-a	15	4-b
16	9	16	3-a	16	3-a	16	3-a
17	3-d	17	5	17	8	17	3-a
18	4-a	18	3-a	18	9	18	3-a
19	4-b	19	9	19	9	19	7
20	4-b	20	9	20	7	20	1
21	8	21	7	21	4-a	21	4-b
22	4-b	22	7	22	3-c	22	7
23	5	23	4-b	23	3-d	23	4-a
		24	4-b	24	4-b	24	2
		25	3-a	25	2	25	8
		26	4-b	26	6		
		27	6	27	4-a		

Suggestions for Developing Skills in Reading Graphs and Charts:

1. The simplest types of exercises are those in reading simple data showing class progress on spelling charts, arithmetic progress charts, results of tests, etc. Such charts have simple data on two axes, one the children's names, the other the scores.

2. Questions may be given by the teacher in connection with simple bar graphs in geography, in which each axis has but one kind of data on it, perhaps the name of the state and the amount of production of a commodity, such as petroleum. The question might read, "How much petroleum was produced by Texas in 1932?" The date would be indicated in the title. To increase the difficulty of the reading, another variable could be added to one axis, such as the year, for example. Production could be given not only by states but by years.

3. Difficulties are added when the child must transpose data, as, for example, when production is given in millions of bushels, or thousands of tons, and so on.

4. In addition to the mere reading of the data from the graph, questions may call for interpretation. For example, "How does the amount of production of coal in the United States compare with that of Germany?"

5. Children may be given a certain graph or table and permitted to state their own questions from it.

6. Pupils may be given data in a simple table and asked to put the material into a graph. For example, they might show their own progress on tests, or the ages of the group, or spelling scores over a period, and so on.

7. Pupils may be given a simple graph and told to make all the statements they can of facts which the graph or chart shows. The teacher must guard against the inclusion of statements that are not true.

Many of the newer readers on the market have excellent sample lessons in developing skills of the ty[illegible] described here. Again let it be said that the skills are most clearly and understandingly developed, not in isolation, but in connection with the getting of lessons in any of the subjects.

IOWA EVERY-PUPIL TESTS OF BASIC SKILLS

New Edition

TEST B: WORK-STUDY SKILLS — FORM N

ADVANCED BATTERY — GRADES 5-6-7-8-9

By

H. F. SPITZER, in collaboration with ERNEST HORN, MAUDE MCBROOM, H. A. GREENE, and E. F. LINDQUIST (General Editor), all of the College of Education, State University of Iowa, with the Assistance of the Faculty of the University Experimental Schools.

(*Tear off carefully along this perforation.*)

Directions: The other side of this page is an *answer sheet* on which you will mark your answers to all of the questions in this test. To use this answer sheet, you will have to tear it off. Do this now, tearing very carefully along the perforation at the left-hand side of this page.

* * * * *

Each question in Part I of this test is followed by four possible answers, only one of which is correct or definitely better than any of the others. To answer a question, first decide which is the best answer, then find the *row* of boxes on the answer sheet numbered the same as the *question*, and then place an **X** in one of these boxes, as follows:

If you think the *first* answer is best, mark the *first* box in the row.

If you think the *second* answer is best, mark the *second* box in the row.

If you think the *third* answer is best, mark the *third* box in the row.

If you think the *fourth* answer is best, mark the *fourth* box in the row.

Answer the questions in the order in which they are given, but do not linger too long over difficult questions. Skip them, and return to them later if time permits. If you do skip any question, be sure to skip the corresponding row of boxes on the answer sheet also. Any mark which you unintentionally place in a wrong row will count against you. Mark only *one* box in each row. If you change your mind about an answer, erase your first mark very thoroughly.

Some parts of this test are quite long, and you are not expected to answer all of the questions in each part in the time allowed. Do not become discouraged if you are told to stop working on a part before you have finished it. Work as rapidly as you can without becoming careless.

Do not begin work until you are told to do so.

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ANSWER SHEET: WORK-STUDY SKILLS TEST

Name ______________________ Grade ______
(last name) (first name)

Age on Last Birthday ______ (years)
Number of Months Since Last Birthday ______
Sex ______ (boy or girl)

Town or City ______________________

School ______________________

Teacher ______________ Date ______

SCORES

	Poss. Score	Raw Score	Grade Equivalent*	
Part I	(42)	______	______	______
Part II	(20)	______	______	______
Part III	(22)	______	______	______
Part IV	(25)	______	______	______
Part V	(27)	______	______	______
Total	(136)	______	______	______

*See p. 10 in Examiner's Manual for Conversion Table for Form N.

Part I
Maps

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Part II
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Part III
Index

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Part IV
Dictionary

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Part V
Graphs, Charts

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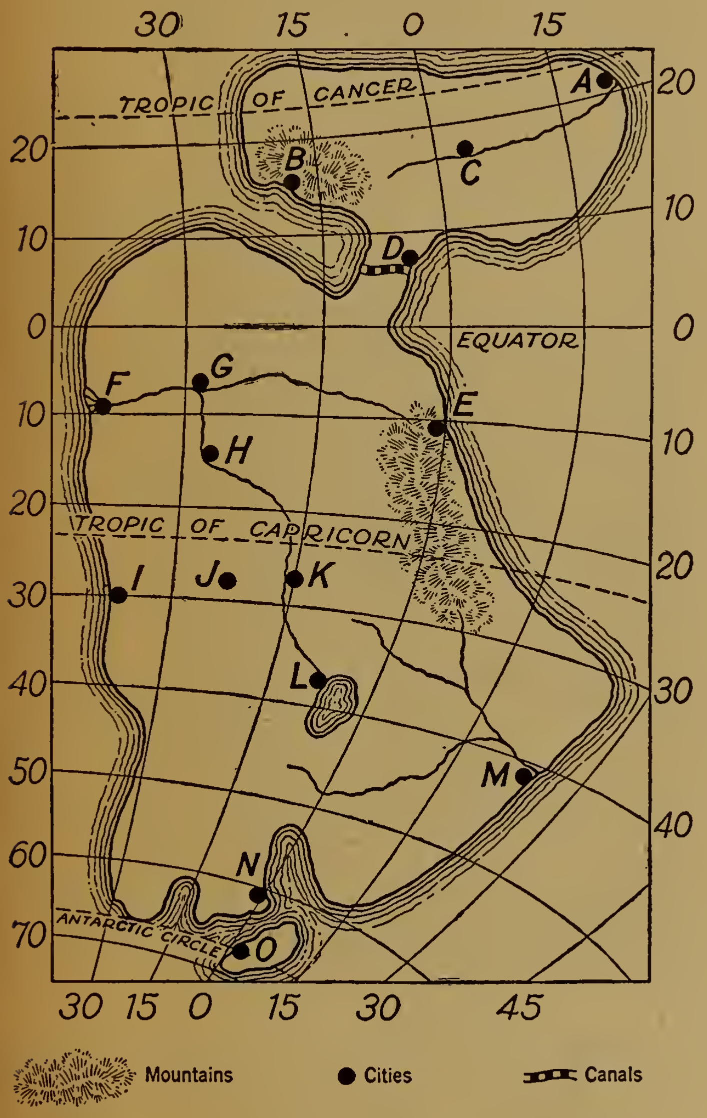
PART I. MAP READING (Cont.)

Section B

Directions: The questions at the bottom of this column and in the column to the right are based on the map below, which is a map of an imaginary land. Answer the questions in the same way that you did those in Section A.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ANTARCTIC CIRCLE
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E
F
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H
I
J
K
L
M
N
O
Mountains
● Cities
Canals

12. Which city is located on an isthmus?
1) A 2) D 3) F 4) O

13. What direction is E from N?
1) North 3) Northeast
2) South 4) Northwest

14. When it is summer at K, what season is it at N?
1) Summer 3) Spring
2) Winter 4) Fall

15. Which city is in the tropics and yet might have ice and snow within a few miles of it the year around?
1) A 2) B 3) D 4) F

16. Upon what is B located?
1) A lake 3) A gulf
2) An isthmus 4) A delta

17. Which of these cities is in west longitude?
1) C 2) E 3) M 4) O

18. Which city probably ships many furs and pelts?
1) A 2) F 3) M 4) N

19. Which of these best describes the climate at A?
1) Extremely cold 3) Temperate
2) Cold 4) Hot

20. When it is noon at E, at which of the following cities would it already be afternoon?
1) N 3) M
2) F 4) One cannot tell from the map

21. Which of the following seaports is most likely to be closed during August because of ice?
1) A 2) E 3) N 4) M

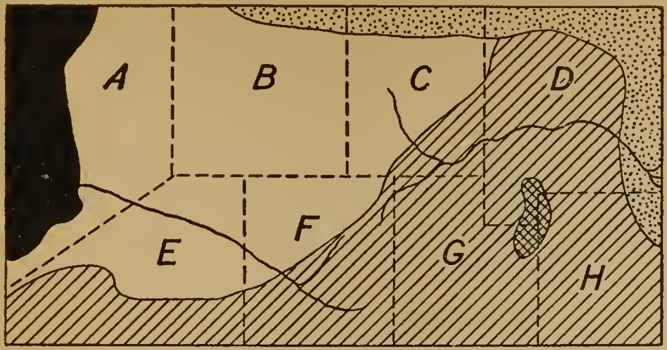
22. At which city would the sun be shining at midnight in June?
1) A 2) D 3) N 4) None

23. Which of these cities probably ships large quantities of pork and beef?
1) D 3) N
2) M 4) One cannot tell from the map

24. In traveling downstream from H, what is the last city you would reach?
1) F 2) L 3) E 4) G

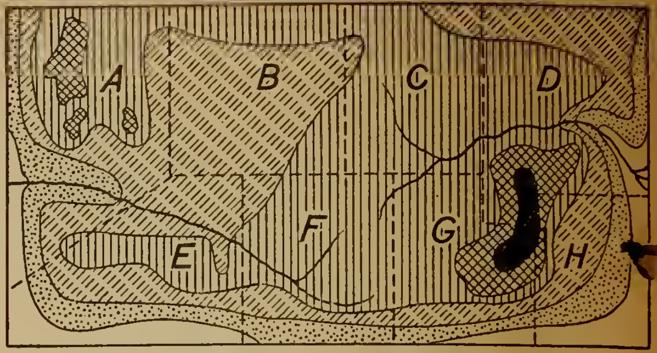
25. At which of these cities would the North Star be visible in the sky?
1) E 2) M 3) O 4) None

(Go on to the next page.)



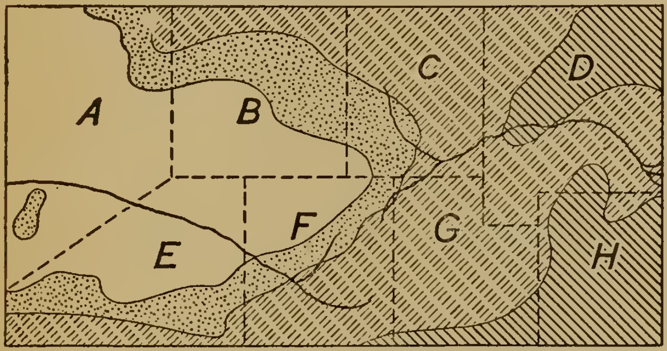
MAP 1. TEMPERATURE ZONES

■ Very hot
░ Warm at all seasons
▦ Too cold for agriculture
□ Hot summers, cool winters
▨ Warm summers, cold winters



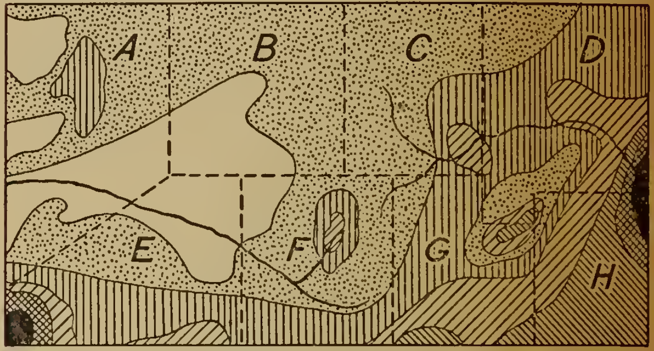
MAP 2. ELEVATION (in number of feet above sea level)

□ 0 - 500
▨ 1000 - 2000
▦ 5000 - 10,000
░ 500 - 1000
▥ 2000 - 5000
■ Over 10,000



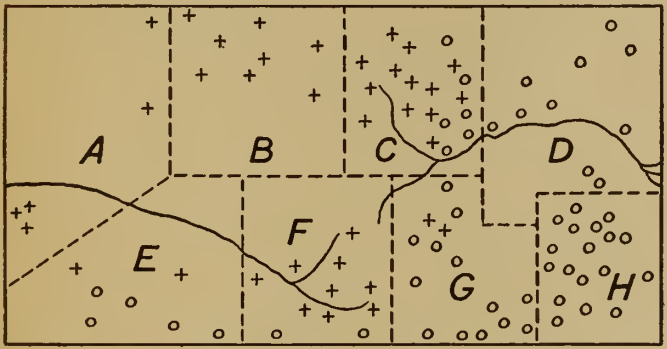
MAP 3. RAINFALL (in inches per year)

□ Under 10
▨ 20 - 40
░ 10 - 20
▧ 40 - 80



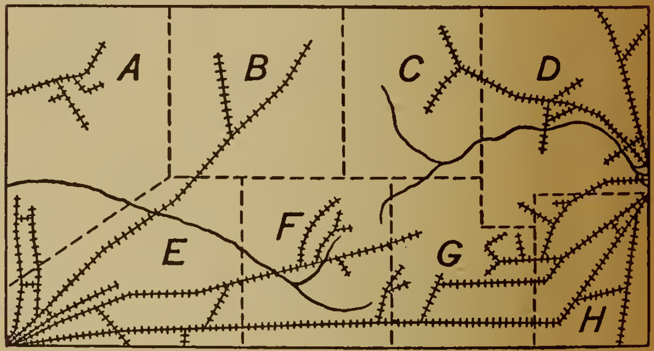
MAP 4. POPULATION (in number of people per square mile)

□ Less than 1
▨ 16 - 32
■ Over 128
░ 1 - 8
▧ 32 - 64
▥ 8 - 16
▦ 64 - 128

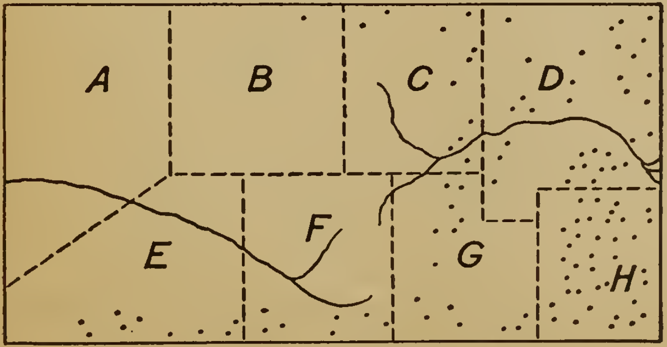


MAP 5. SHEEP AND CATTLE (Each mark represents 10,000 head)

+ + Sheep
o o Cattle

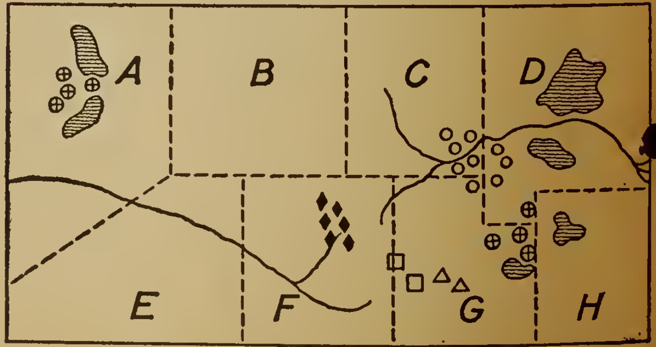


MAP 6. CHIEF RAILROADS



MAP 7. CORN (Each dot represents 35,000 bu.)

0 50 100 200 300 400 500
Scale of Miles



MAP 8. PRINCIPAL MINERAL WORKINGS

Coal
♦ Diamonds
o Iron
△△ Copper
⊕ Gold
□ Silver

Section C

Directions: These questions are based upon the maps on the opposite page. These maps furnish facts about an imaginary land. Read the question and then consult the maps that will help to determine the correct answer. For each question, mark your choice by putting an **X** in the proper box on the answer sheet.

26. Which of these might be the elevation of a city in southwestern B?

1) **2370**
2) **880**
3) **4640**
4) **1250**

27. How many states contain areas in which there is less than one person to the square mile?

1) **One**
2) **Two**
3) **Three**
4) **Four**

28. Which state has the *least* number of miles of railroads?

1) **A**
2) **B**
3) **C**
4) **D**

29. What is the annual rainfall in the area where the population is less than one person to the square mile?

1) **Under 10 inches**
2) **10 to 20 inches**
3) **20 to 40 inches**
4) **40 to 80 inches**

30. What might explain why there is an area of dense population in north central F?

1) **There is a railroad center there**
2) **A mountain resort is located there**
3) **Rich deposits of diamonds are found there**
4) **It is a good agricultural region**

31. How would you expect to find the iron mined in southeastern C to be shipped to the industrial center in southeastern D?

1) **By boat**
2) **By railroad**
3) **By truck**
4) **The map doesn't give any clue**

32. In which of these states would you expect to find the most cattle fattened?

1) **A**
2) **C**
3) **F**
4) **H**

33. What is probably the chief occupation of the people in B?

1) **Mining**
2) **Grain-growing**
3) **Sheep-herding**
4) **Manufacturing**

34. What probably accounts for the fact that it is too cold for agriculture in one section of this country?

1) **The northern latitude**
2) **Cold ocean currents and winds**
3) **A high altitude**
4) **Huge annual snowfalls**

35. What is the altitude of the silver-mining district?

1) **Under 1000 feet**
2) **2000 to 5000 feet**
3) **5000 to 10,000 feet**
4) **Over 10,000 feet**

36. Which of the following describes the climate of western A?

1) **A hot, moist climate**
2) **A hot desert climate**
3) **A temperate climate**
4) **A cold, dry climate**

37. Which of the following four states probably has the smallest number of farms?

1) **B**
2) **D**
3) **G**
4) **H**

38. What is probably the freight of the railroads in northern A?

1) **Dairy products**
2) **Iron and steel**
3) **Grain**
4) **Coal**

39. Which of the following four states is probably the leading industrial state?

1) **A**
2) **E**
3) **F**
4) **G**

40. Which would probably explain why the southeastern half of H is relatively densely populated?

1) **It is an important mining region**
2) **It is an important farming region**
3) **It is a famous mountain resort country**
4) **It is at the center of an important sheep-raising area**

41. Which of the following might be described as low, wet land with warm summers and cold winters?

1) **Western A**
2) **Southeastern C**
3) **Central F**
4) **Southeastern H**

42. Which of these would be the best place in which to establish a large dairy?

1) **Central H**
2) **Southwestern D**
3) **Northern E**
4) **Northern C**

(Do not turn this page until told to do so.)

PART II. USE OF REFERENCES

Directions: For each question, decide which answer is best and then mark an **X** in the proper box on the answer sheet. Mark only *one* box for each question.

Sample:

0. How long do moths live?
1) A dictionary
2) An encyclopedia
3) A world almanac
4) *Statesman's Yearbook*

---

1. Where would you look to find whether or not the equator passes through Persia?
1) In a world almanac
2) On a globe
3) In the *Arabian Nights*
4) In the *National Geographic Magazine*

2. Which tells whether or not the word *communication* means "travel"?
1) A language book
2) A dictionary
3) An encyclopedia
4) A railroad time-table

3. To which government agency would you write for information on methods of killing potato bugs?
1) United States Public Health Service
2) United States Department of Agriculture
3) United States Bureau of the Census
4) United States Department of the Interior

4. In which would you find the second stanza of the poem, "Wynken, Blynken, and Nod"?
1) An encyclopedia
2) An anthology of children's literature
3) *The Golden Book of Favorite Songs*
4) *American Magazine*

5. In which would you find the birth rate in Iowa for last year?
1) Iowa Public Health Bulletin
2) A hygiene book
3) An encyclopedia
4) *Hygeia*

6. Which tells how to find the area of a triangular garden?
1) *Better Homes and Gardens*
2) An atlas
3) A seed catalogue
4) An arithmetic book

7. Which tells why dandelion plants are so hard to kill?
1) A dictionary
2) *Field and Stream*
3) Comstock's *Handbook of Nature Study*
4) *Plants Useful to Man*

8. Which would contain the most information about the catacombs of ancient Rome?
1) A dictionary
2) A world almanac
3) A history of the British Empire
4) An encyclopedia

9. In which would you find the most information about honey bees?
1) A dictionary
2) *Insect Pests*
3) An encyclopedia
4) *Flowers and Flowering Plants*

10. In which would you look to find which of the forms in parenthesis is correct in the sentence, "The radio table was (stationary-stationery)"?
1) A dictionary
2) A speller
3) *Radio Guide*
4) An encyclopedia

11. Which tells whether *Hebrew* should be written with a capital or a small *h*?
1) A speller
2) A language book
3) A dictionary
4) A world almanac

12. Which tells the latest news about the situation in Europe?
1) A weekly news magazine
2) A next-door neighbor
3) A radio commentator broadcast
4) Bulletins of the United States Department of War

13. Which tells if the Yellow River is navigable?
1) An encyclopedia
2) A map of Asia
3) An atlas
4) A world almanac

14. Which tells the number of people in the United States employed in the manufacture of cigars and cigarettes?
1) A world almanac
2) An atlas
3) An anthology
4) A geography of North America

15. Which tells how the production of lumber in the United States in 1920 compares with that of today?
1) A world almanac
2) An atlas
3) An encyclopedia
4) A history book

16. In which could you find the airline distance from Huntley, Minnesota, to Fairmont, Missouri (both towns of less than 500 population)?
1) A fourth grade geography book
2) A world almanac
3) An atlas
4) A railroad time-table

17. Which tells the name of the Assistant Secretary of the Treasury of the United States?
1) A world almanac
2) An encyclopedia
3) A history book
4) The Constitution of the United States

18. Which tells the cause of tides?
1) A history book
2) A world almanac
3) An encyclopedia
4) *Nature Magazine*

19. Which tells where Henry Wallace attended school?
1) A history book
2) *The Nation's Schools*
3) *Who's Who*
4) *Wallace's Farmer*

20. Which tells whether a man with a broken *fusil* should go to a doctor, a carpenter, or a gunsmith?
1) An atlas
2) A dictionary
3) A science book
4) A world almanac

(Do not turn to the next page until told to do so.)

PART III. USE OF INDEX

Directions: The questions at the right below are based upon the index at the left. *The answer to each question is a number or an* **X**. You are to decide from studying the index what number is the proper answer to each question. Then write that number on the answer sheet in the blank that is numbered the same as the question. If the index does not contain the answer, place an **X** in the blank.

For example, the first sample question asks for the page on which you would find information about the commercial airplane. In the index, we find that the commercial airplane is discussed on page 849; so 849 is written in the blank numbered zero on the answer sheet. The index does not include a definition of crime, so an **X** is placed in the blank for the second sample.

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QUESTIONS

Samples:

0. What page tells something about the commercial airplane?

00. On what page is crime defined?

---

1. What page gives a definition of the universe?

2. *How many* pages tell about the food of plants?

3. What page would tell you how old the earth is?

4. To which page would you turn *first* to find something about the song of the lark?

5. On what page would you look for a diagram of the roots of a plant?

6. What page *begins* the *longest* discussion of bacteria?

7. If you wanted to know how many more airplanes were made today than in 1920, to what page would you turn?

8. On what page is there a discussion of sugar production?

9. On what page would you look for information about the penguin, a bird which does not fly?

10. On what page does the *longest* discussion of the shape of our universe *end?*

11. If you wanted to know whether or not the Mississippi River forms a part of the boundary of Louisiana, to what page would you turn?

12. On what page would you find a discussion of the movement of the earth?

13. On what page would you look to find whether ferns grow from seeds or spores?

14. On what page would you look to find a discussion of ways in which microbes move?

15. On what page would you look to find the color of a raven's eggs?

16. On what page would you look to find the population of New Orleans, Louisiana?

17. If you wanted to find out whether or not the volcano, Krakatoa, is in America, on what page would you look?

18. On what page would you look *first* to find a picture of a machine gun?

19. Where would you look to find whether rubies are worth more than pearls?

20. On what page would you find an explanation of a theory about the way the earth was formed?

21. On what page would you look to find a discussion of one-celled plants that carry disease?

22. What page gives a list of the volcanoes in Africa?

(*Do not turn this page until told to do so.*)

SAMPLE DICTIONARY

ex·pe′di·ent (ĕks·pē′dĭ·ĕnt), *adj.* Wise; fit for bringing about the result that is wanted.

fe′mur (fē′mẽr), *n.*; *pl.* FEMURS (fē′mẽrz), FEMORA (fĕm′ō̇·rȧ). The thigh bone.

fête (fāt), *n.* A feast or celebration. —*v.* To feast; to honor by having a feast.

frisk′y (frĭs′kĭ), *adj.*; FRISK′I·ER (-kĭ·ẽr); FRISK′I·EST. Playful; lively.
frisk′i·ly, *adv.* **frisk′i·ness**, *n.*

gall (gôl), *n.* **1.** A bitter greenish liquid stored in the gall bladder. **2.** The gall bladder. **3.** Bitterness; spite. **4.** A sore spot on a horse's back made by rubbing. **5.** A swelling or growth on a twig or leaf of a plant.

gar·de′ni·a (gär·dē′nĭ·ȧ), *n.* A white flower with a sweet smell.

Gua′de·loupe′ (gwä′dē·lo͞op′), *n.* A French colony in the West Indies.

glum (glŭm), *adj.*; GLUMMER; GLUMMEST. Silent and gloomy; dismal.

half hitch. A kind of sailor's knot.

hau′berk (hô′bûrk), *n.* A coat of mail, worn by knights in the Middle Ages.

hei′nous (hā′nŭs), *adj.* Hatefully bad.

in- (ĭn-). A prefix meaning *not.*

in′got (ĭng′gŏt), *n.* A block or bar of metal.

jar′di·niere′ (jär′dĭ·nē̦r′; zhär′dĭ·nē̦r′), *n.* An ornamental pot for plants.

Jeanne′ d'Arc′ (zhän′därk′). The French form of Joan of Arc, who led the French to victory against the English but was captured and burned as a witch.

jen′net (jĕn′ĕt), *n.* A small Spanish horse.

kedge (kĕj), *v.* To move a boat by carrying out a light anchor (called a *kedge*), dropping it overboard, and hauling the vessel up to it.

kind′ly (kīnd′lĭ), *adj.*; KIND′LI·ER (-lĭ·ẽr); KIND′LI·EST. Good; sympathetic; kind.

la′bi·al (lā′bĭ·ăl), *adj.* Having to do with the lips; pronounced chiefly with the lips.

la·cu′na (lȧ·kū′nȧ), *n.*; *pl.* LACUNAE (-nē). A blank space or gap in a written paper or book; a gap.

lam·poon′ (lăm·po͞on′), *v.* To make fun of someone in writing; to ridicule.

lar′gess, lar′gesse (lär′jĕs), *n.* A large gift; generous giving.

lash (lăsh), *n.* **1.** A stroke with a whip. **2.** The part of a whip above the handle. **3.** Short for EYELASH. —*v.* **1.** To whip, strike, or beat. **2.** To scold.

laun′der (lôn′dẽr; län′dẽr), *v.* To wash, or to wash and iron, clothes.
laun′der·er, *n.*

lave (lāv), *v.* To wash or bathe; also, to flow against.

AIDS TO USING THIS SAMPLE DICTIONARY:

1. **Key words for pronunciation:** āle, chā̇otic, câre, ădd, ăccount, ärm, ȧsk, sofȧ; ēve, ē̇vent, ĕnd, silĕnt, makẽr; īce, ĭll, charĭty; ōld, ō̇bey, ôrb, ŏdd, sōft, cŏnnect; fo͞od, fo͝ot; out, oil; cūbe, ū̇nite, ûrn, ŭp, circŭs, menü.
2. Syllables are indicated by a dot (·) or by the light (′) or heavy (′) accent mark.
3. Abbreviations used: *adj.*, adjective; *adv.*, adverb; *conj.*, conjunction; *n.*, noun; *pl.*, plural; *prep.*, preposition; *pret.*, preterit; *sing.*, singular; *v.*, verb; *v. i.*, verb intransitive; *v. t.*, verb transitive.
4. Adjectives are compared by adding *more* and *most* or *-er* and *-est* to the form given, unless other forms are given (in capitals).

PART IV. USE OF DICTIONARY

Directions: Use the sample dictionary on the opposite page to answer the following questions. For each question, place an **X** in the proper box on the answer sheet. Mark only *one* answer to each question.

1. Which of the following is correct?
   1) **half-hitch**
   2) **half hich**
   3) **half hitch**
   4) **halfhitch**

2. Which of the following is a correct way to divide *jardiniere* at the end of a line?
   1) **jard-iniere**
   2) **jardi-niere**
   3) **jardin-iere**
   4) **jardini-ere**

3. In which of the following is *labial* used correctly?
   1) **The insurance company is *labial* for the damage**
   2) **The *labial* had been torn off the box**
   3) **"B," "p," and "m" are *labial* consonants**
   4) **Be sure to *labial* all the jars**

4. Of which of the following might an *ingot* be made?
   1) **steel**
   2) **wood**
   3) **glass**
   4) **sod**

5. Which meaning of *gall* given in the dictionary best fits the way it is used in the sentence, "We asked the man at the greenhouse what to do for oak gall"?
   1) **first**
   2) **third**
   3) **fourth**
   4) **fifth**

6. *Fête* rhymes with which of the following words?
   1) **meet**
   2) **late**
   3) **get**
   4) **height**

7. Which of the following should be used in the blank in the sentence, "Peter was the ________ of the two rabbits"?
   1) **more frisky**
   2) **friskier**
   3) **more friskier**
   4) **friskiest**

8. Where would you go if you wanted to see a *hauberk*?
   1) **to a museum**
   2) **to a garage**
   3) **to a farm**
   4) **to a shipyard**

9. With which of the following does the first syllable of *heinous* rhyme?
   1) **cry**
   2) **free**
   3) **the**
   4) **tray**

10. On which syllable is *gardenia* accented?
    1) **first**
    2) **second**
    3) **third**
    4) **fourth**

11. Which is a *correct* though *not a preferred* spelling of the plural of *femur*?
    1) **femer**
    2) **femurs**
    3) **femerz**
    4) **femora**

12. What is a *jennet*?
    1) **a tool**
    2) **a bird**
    3) **an animal**
    4) **a fruit**

13. What part of speech is *friskily*?
    1) **adverb**
    2) **adjective**
    3) **verb**
    4) **noun**

14. Which is the correct spelling for a word meaning "a person who washes or launders clothes"?
    1) **launder**
    2) **launderer**
    3) **laundrer**
    4) **laundrier**

15. In which of the following is *lave* used correctly?
    1) **The carpenter forgot his *lave***
    2) **Watch the water *lave* the rocky shore**
    3) **Masses of hot *lave* came from the volcano**
    4) **He *laved* the prisoner with a whip**

16. Which of the following is a correct way to divide *Guadeloupe* at the end of a line?
    1) **Guad-eloupe**
    2) **Gua-deloupe**
    3) **Guadel-oupe**
    4) **Gu-adeloupe**

17. What part of speech is *lampoon*?
    1) **adverb**
    2) **adjective**
    3) **verb**
    4) **noun**

18. Which of the following spellings is correct but *not preferred*?
    1) **largesse**
    2) **largess**
    3) **larjes**
    4) **larjesse**

19. Which of the following should be used in the blank in the sentence, "He was the ________ person there"?
    1) **glummest**
    2) **glummiest**
    3) **most glum**
    4) **most glummest**

20. Which of the following rhymes with the last syllable of the plural of *lacuna*?
    1) **buy**
    2) **tree**
    3) **play**
    4) **foe**

21. What is the meaning of the italicized word in this sentence? "They thought the plan was *inexpedient.*"
    1) **a good one**
    2) **not very wise**
    3) **impossible**
    4) **untried**

22. Which meaning of *lash* given in the dictionary best fits the way it is used in the sentence, "We could hear her *lash* her husband with the most bitter words"?
    1) **No. 1 as a noun**
    2) **No. 2 as a noun**
    3) **No. 1 as a verb**
    4) **No. 2 as a verb**

23. Which of the following would you be most likely to describe with the word *heinous*?
    1) **a smile**
    2) **a murder**
    3) **a plant**
    4) **a sunset**

24. In which of the following is *kedge* used correctly?
    1) **The plumber broke his *kedge***
    2) **They had to *kedge* the vessel the rest of the way to the island**
    3) **The men were using a big *kedge* to haul away the gravel**
    4) **The monkeys were kept in a *kedge***

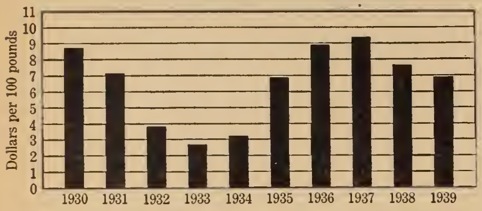
25. With which of the following does the first syllable of *Jeanne d'Arc* rhyme?
    1) **seen**
    2) **wan**
    3) **tan**
    4) **bone**

(Do not turn this page until told to do so.)

PART V. READING GRAPHS, CHARTS, AND TABLES

Directions: For each question, decide which answer is correct and then mark an **X** in the proper box on the answer sheet. Mark only *one* box for each question.

Average Prices Received by American Farmers for Hogs (1930–1939)



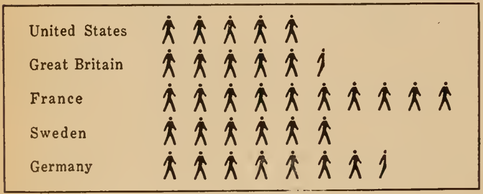
Questions 1–3 *are based on the bar graph above.*

1. During what year shown on the graph did the farmers receive the highest average price for their hogs?
1) **1930** 2) **1933** 3) **1935** 4) **1937**

2. After the depression in 1933, in what year did the average price of hogs first reach the 1930 level?
1) **1935** 2) **1936** 3) **1937** 4) **Never**

3. How did the average price of hogs in 1937 compare with that in 1933?
1) **It was the same in both years**
2) **It was 6% higher in 1937**
3) **It was nearly twice as high in 1937**
4) **It was more than three times as high in 1937**

Number of Persons Per Radio in Various Countries of the World (1938)



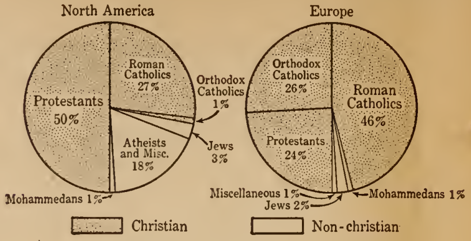
Questions 4–6 *are based on the picture graph above.*

4. Which of the countries named in the graph has the most radios in proportion to its population?
1) **United States** 3) **France**
2) **Great Britain** 4) **Germany**

5. How does the *number* of radios in France compare with that in Great Britain?
1) **There are more radios in Great Britain**
2) **There are more radios in France**
3) **There is the same number of radios in both countries**
4) **The graph does not tell**

6. Of the countries listed, how does Sweden rank in the number of radios in proportion to its population?
1) **First** 2) **Second** 3) **Third** 4) **Fourth**

Per Cent of Total Population of North America and Europe with Various Religious Beliefs



Questions 7–10 *are based on the circle graphs above.*

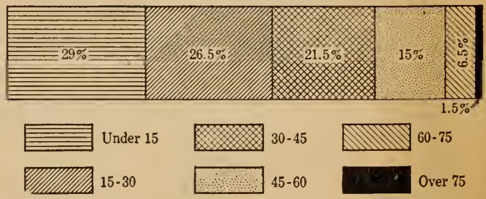
7. What proportion of the population of Europe is Catholic, both Orthodox and Roman?
1) **About one-fourth** 3) **About three-fourths**
2) **Nearly half** 4) **Over nine-tenths**

8. Which generalized statement can be safely made from the data given in the graph?
1) **There is a larger number of non-Christians in North America than in Europe**
2) **The proportion of non-Christians in the population of Europe is about three times as great as in North America**
3) **The proportion of non-Christians in the population of North America is about the same as in Europe**
4) **The proportion of non-Christians in the population of Europe is less than one-fourth as great as in North America**

9. How does the *number* of Protestants in Europe compare with the number of Catholics, both Roman and Orthodox?
1) **They are very nearly the same**
2) **There are about three times as many Catholics**
3) **There are about one-third as many Catholics**
4) **One cannot tell from the graph**

10. The religious group which ranks first in size in North America ranks how in Europe?
1) **First** 2) **Second** 3) **Third** 4) **Fourth**

Distribution of the Population of the United States Among Various Age Groups (1930)



Questions 11–13 *are based on the graph above.*

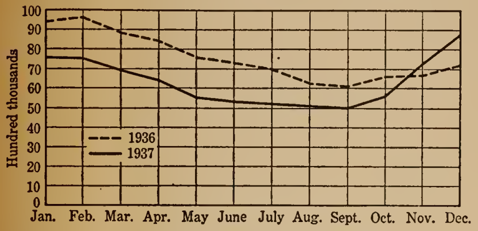
11. What portion of the people of the United States are *over* 60 years of age?
1) **About one-third** 3) **More than one-sixth**
2) **About one-fourth** 4) **Less than one-tenth**

12. In a city of 1000, about how many people would you expect to find under 15 years of age?
1) **29** 2) **100** 3) **290** 4) **500**

(Go on to the next page.)

13. Which of these facts about the population of the United States is shown to be true by the graph?
    1) **More than half of the population is over 50 years**
    2) **About one-third of the population is between the ages of 30 and 45**
    3) **More than half of the population is under 30 years**
    4) **The number of people under 15 is less than the number of people over 60**

[illegible]timated Number of Unemployed in the United States Each Month During 1936 and 1937



Questions 14–17 *are based on the line graph above.*

14. During which month of the year does there seem to be the *least* unemployment?
    1) **January** 3) **September**
    2) **May** 4) **December**

15. During which month in 1937 was there the most unemployment in the United States?
    1) **January** 3) **September**
    2) **February** 4) **December**

16. Approximately how many people were unemployed in February of 1937?
    1) **7,500,000** 3) **75 in every 100,000 population**
    2) **9,500,000** 4) **750,000**

17. Which conclusion can be safely drawn from this graph?
    1) **Unemployment is steadily decreasing**
    2) **In general, more people were unemployed in 1936 than in 1937**
    3) **Unemployment is always greater in January and February than in the other months of the year**
    4) **There were fewer unemployed in September of 1937 than at any other time in history**

Chief Food Crops in New York State in 1938

Crop	Thousands of acres	Thousands of bushels	Thousands of dollars
Corn	685	25,345	16,474
Wheat	303	7,533	4,746
White Potatoes	220	26,840	16,104
Oats	782	26,588	8,774
Barley	146	4,307	2,067
Rye	19	323	174
Buckwheat	161	2,496	1,323

Questions 18–22 *are based on the table above.*

18. How do white potatoes rank in acreage among the food crops given?
    1) **First** 2) **Second** 3) **Third** 4) **Fourth**

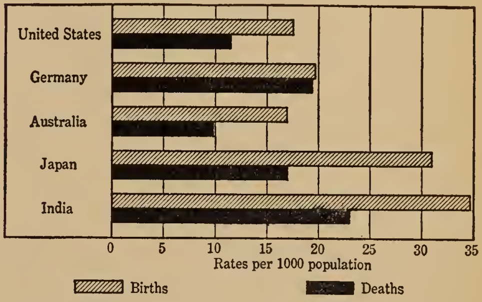
19. How does the white potato crop rank in cash value among the food crops given?
    1) **First** 2) **Second** 3) **Third** 4) **Fourth**

20. How did the crop which ranked first in acreage rank in cash value?
    1) **First** 2) **Second** 3) **Third** 4) **Fourth**

21. How does the amount of land planted in corn compare with the amount planted in wheat?
    1) **The amount in corn is slightly larger**
    2) **The amount in corn is more than twice as large**
    3) **The amount in wheat is about 380 acres larger**
    4) **They are the same**

22. How many of the crops given each had a total value of more than ten million dollars in New York State in 1938?
    1) **Two** 2) **Six** 3) **None** 4) **All of them**

Birth and Death Rates of Five Countries of the World in 1937



Questions 23–27 *are based on the bar graph above.*

23. Which country given on the graph has the lowest birth rate?
    1) **United States** 3) **Germany**
    2) **Australia** 4) **India**

24. In which of the countries was the population at the end of 1937 most nearly the same as at the beginning of 1937?
    1) **Germany** 3) **Australia**
    2) **United States** 4) **Japan**

25. On the average, how many people in every thousand died in India in 1937?
    1) **4** 2) **20** 3) **23** 4) **34**

26. About how many children were born in Japan in 1937?
    1) **31** 3) **31,000,000**
    2) **31,000** 4) **The graph doesn't tell**

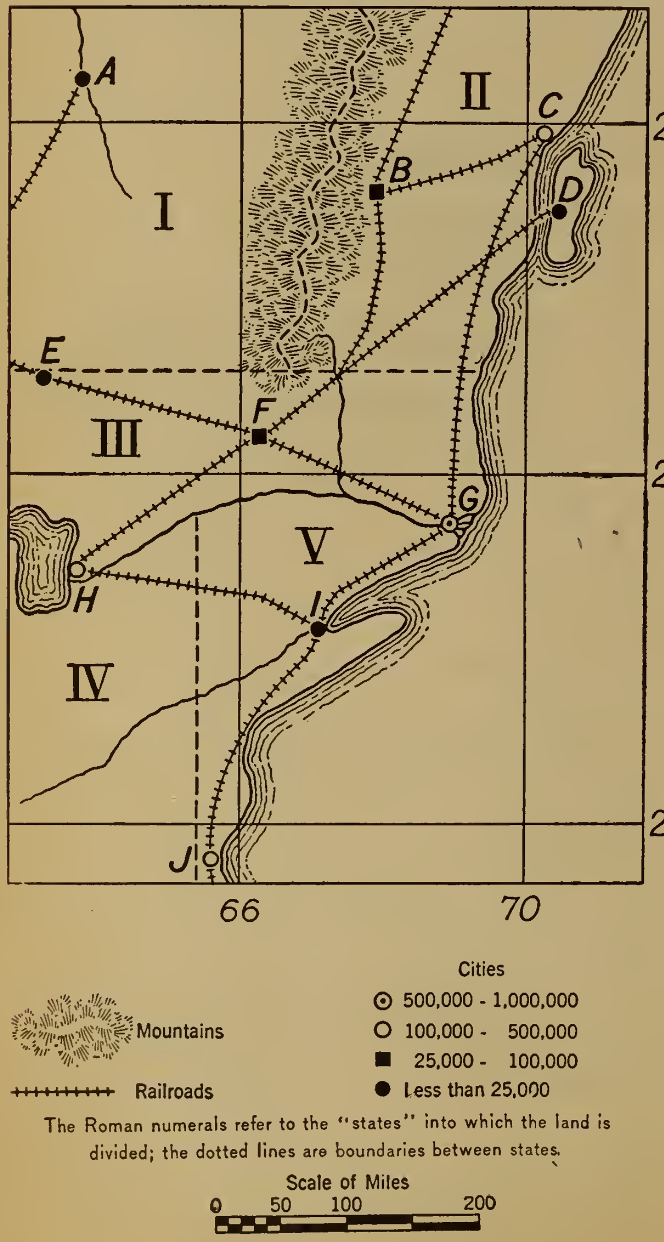
27. How does the birth rate of Japan compare with its death rate?
    1) **They are the same**
    2) **The birth rate is about one-half as large**
    3) **The birth rate is nearly twice as large**
    4) **The birth rate is over 30 per 100**

(*Close your booklet and wait for the papers to be collected*).

PART I. MAP READING

Section A

Directions: These questions are based on the map below. This is a map of an imaginary land. The cities on the map are lettered instead of named. In order to help you find them quickly, these letters have been arranged in alphabetical order, beginning with A near the top. The key to the map is found below it. You are to read each question and decide which of the four answers is correct according to the map; then mark the proper box on the answer sheet.



The Roman numerals refer to the "states" into which the land is divided; the dotted lines are boundaries between states.

Sample:

0. Which of the following cities is farthest from B?
1) C
2) D
3) F
4) H

---

1. Which of the following could be the population of C?
1) 46,000
2) 97,250
3) 205,670
4) 672,820

2. Upon what is G located?
1) An isthmus
2) A bay
3) A canal
4) A delta

3. What is the boundary between states III and V?
1) A railroad
2) A river
3) Mountains
4) An imaginary line

4. About how many miles would you have to travel by railroad from H to visit someone at D?
1) 150 2) 300 3) 450 4) 600

5. On which trip by railroad would you have to cross a large bridge over a sound?
1) C to G
2) G to J
3) F to B
4) F to D

6. The river on which G and H are located flows in what general direction?
1) East 2) West 3) North 4) South

7. What is the approximate longitude of B?
1) 68 E
2) 68 W
3) 21 N
4) 21 S

8. What direction is this country from the equator?
1) North
2) South
3) It is on the equator
4) The map doesn't tell

9. How does the height above sea level at H compare with that at G?
1) H is higher
2) G is higher
3) They are the same
4) The map gives no clue

10. In which of these places would you probably find many swiftly-flowing streams?
1) Western part of State I
2) Western part of State II
3) Southern part of State IV
4) Eastern part of State V

11. The rainfall at B is greater than at C, which is near the coast. What probably explains this?
1) B is farther south
2) Because of the snow melting in the mountains, there is more moisture at B
3) Winds from the ocean drop their moisture when they rise to go over the mountains at B
4) The island near C prevents moist winds from blowing in toward it from the ocean

(Turn the booklet over to page 1 and continue with Section B.)

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